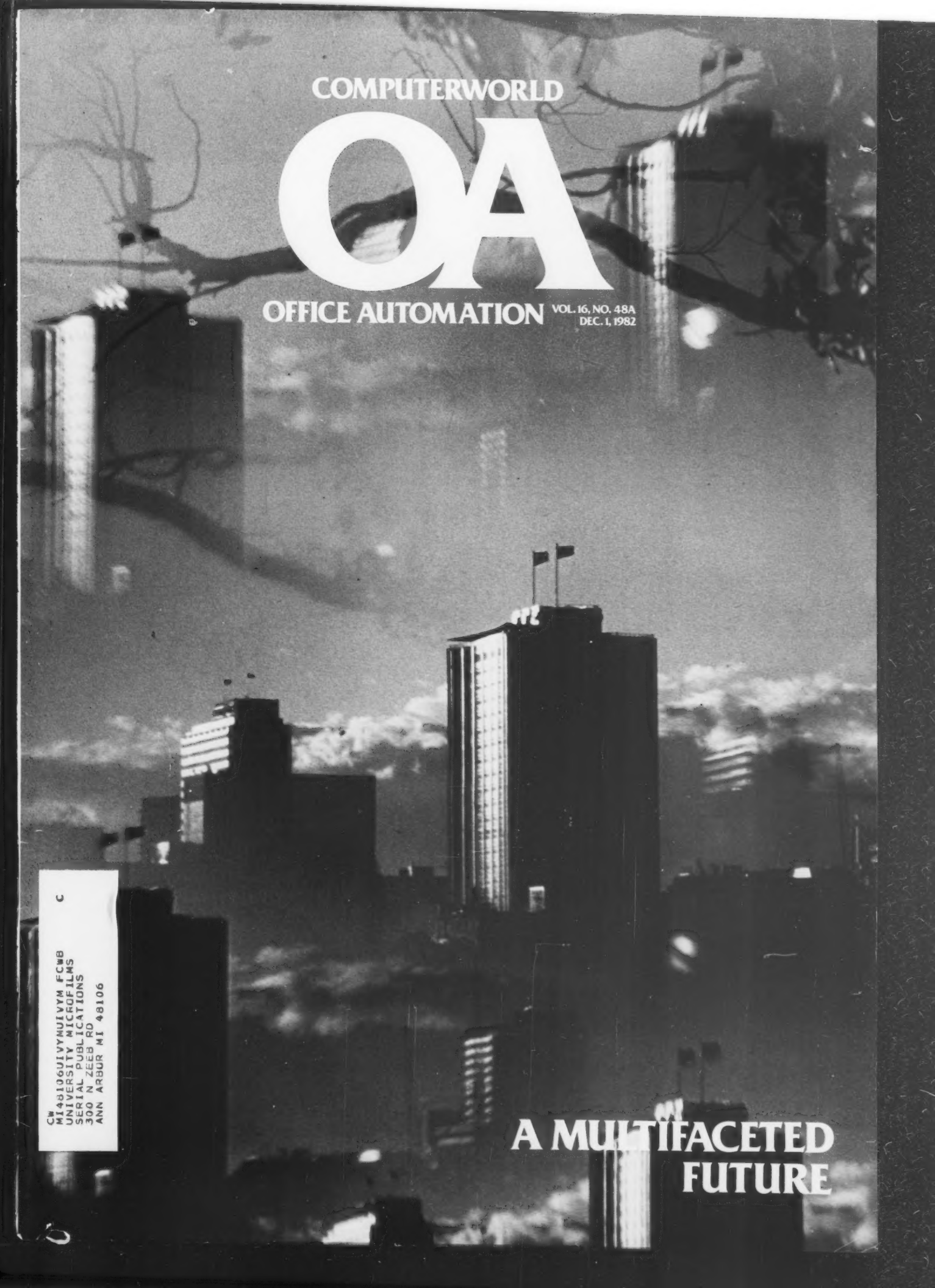
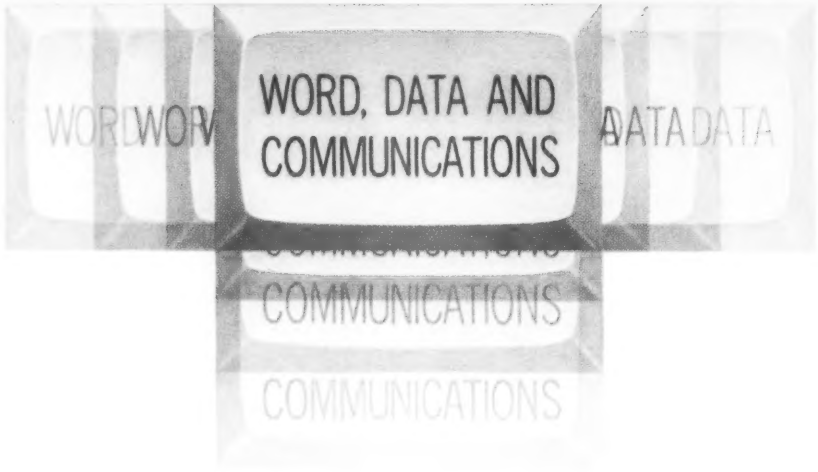


INTEGRATION

COMBINING WORD AND DATA PROCESSING WITH COMMUNICATIONS ON A SINGLE SYSTEM IS HONEYWELL'S APPROACH TO OFFICE AUTOMATION.



Word processing.
Data processing.
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Integrating these functions gives you a powerful and efficient way to access information. From a single keyboard you can manipulate text and data, combine them on one document, and then distribute it throughout your entire organization.

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To aid communication between systems, Honeywell supports a wide variety of protocols: SNA/SDLC, X.25, 2780/3780, HASP/RJE, and others.

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Honeywell Office Automation Systems
Three Newton Executive Park Drive
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Honeywell

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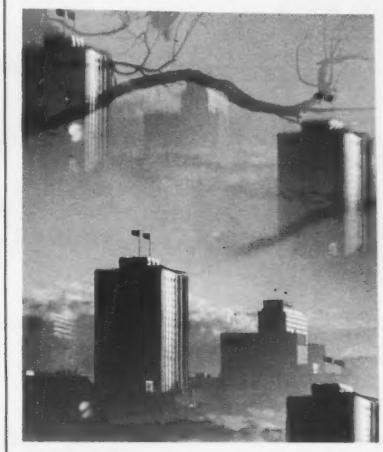

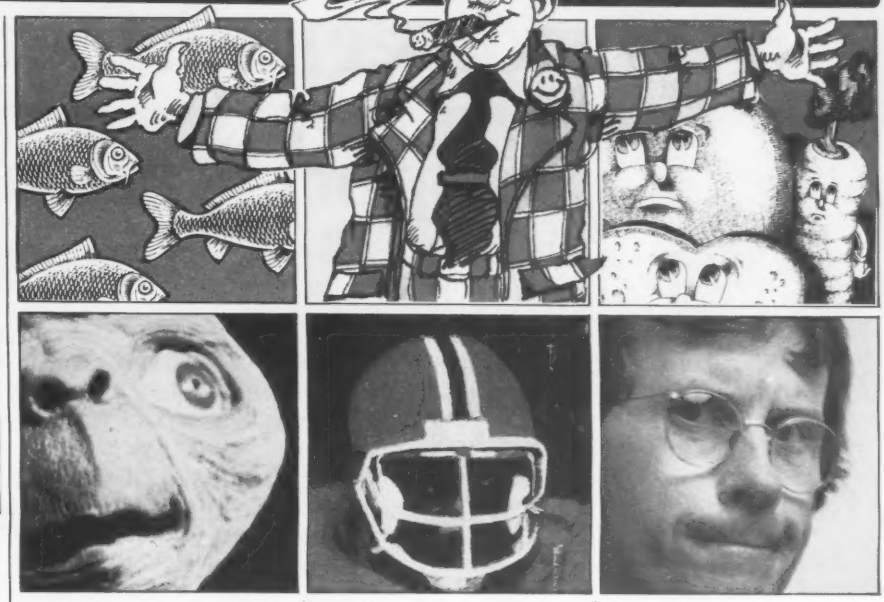

The focus is changing as users enter a multifaceted future in OA. MIS managers face new choices as new and more sophisticated technologies begin to emerge in the office environment.

COMPUTERWORLD

OA

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Hewlett-Packard on customer satisfaction

Support is at the top of most users' lists. This new survey shows

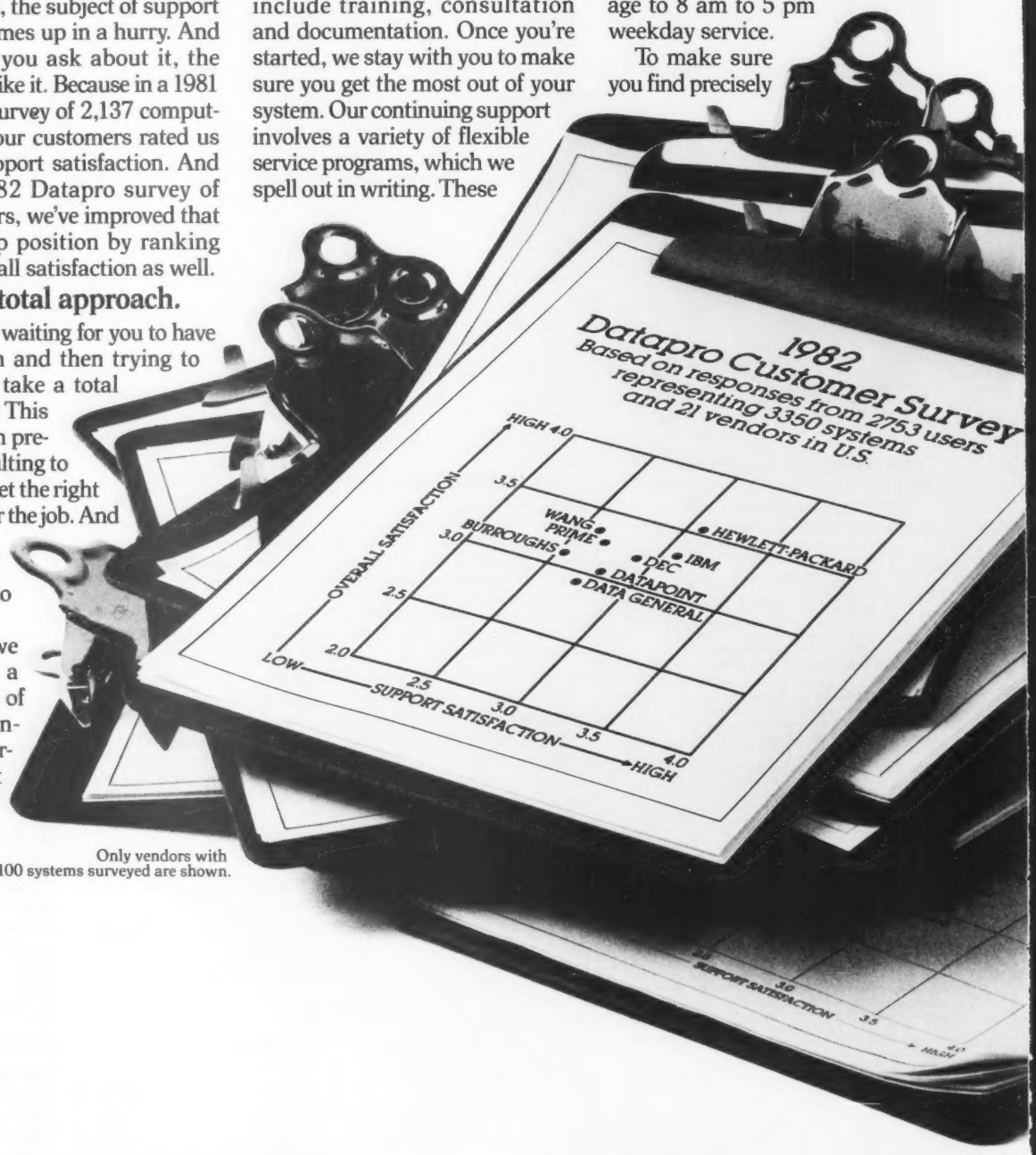
When we talk to potential new customers, the subject of support always comes up in a hurry. And the more you ask about it, the better we like it. Because in a 1981 Datapro survey of 2,137 computer users, our customers rated us #1 for support satisfaction. And in the 1982 Datapro survey of 2,753 users, we've improved that leadership position by ranking #1 in overall satisfaction as well.

The total approach.

Instead of waiting for you to have a problem and then trying to fix it, we take a total approach. This starts with presale consulting to help you get the right product for the job. And understand the best way to use it.

Then we offer you a full range of implementation services to get you up and running fast. These include training, consultation and documentation. Once you're started, we stay with you to make sure you get the most out of your system. Our continuing support involves a variety of flexible service programs, which we spell out in writing. These range from 24-hour, 7-day coverage to 8 am to 5 pm weekday service.

To make sure you find precisely



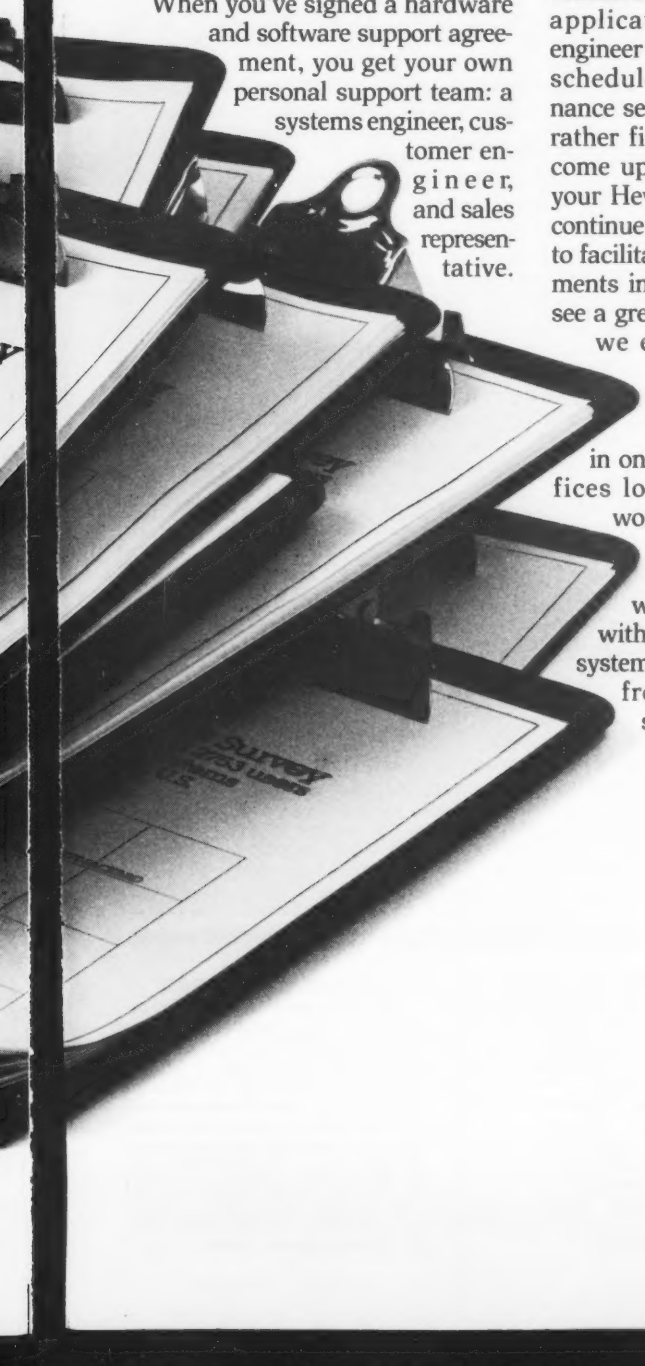
Only vendors with 100 systems surveyed are shown.

computer that HP is, too.

the right approach, you can select options on a price/performance basis. So we can actually customize a service plan just for you.

100% personalized service.

When you've signed a hardware and software support agreement, you get your own personal support team: a systems engineer, customer engineer, and sales representative.



Their job is to make sure you get the results you're after.

They'll help you select from our training, consulting and support programs to develop a plan customized to fit your particular applications. Your customer engineer will carry out regularly scheduled preventive maintenance service, too. Because we'd rather fix problems before they come up. Not afterwards. And your Hewlett-Packard team will continue to work with you closely to facilitate growth and improvements in the years ahead. You'll see a great deal of them because we evaluate their performance on the basis of your success.

Your HP team is based in one of over 200 service offices located throughout the world. And they in turn receive support from their local area center. So whether you need help with application software or system hardware, you get it fast from an informed, local source.

99% Guaranteed Uptime Service.

Because of the strong local support we put behind our products and the reliability we've engineered into them, we can offer you our Guaranteed Uptime Service. This agreement states that if your HP 3000 system is up less than 99% of the time in any consecutive three-month period, your next month's hardware service contract is free. We've made this guarantee available to all current HP 3000 purchasers.

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To find out all the reasons, contact your local HP sales office listed in the White Pages. Or write to Dick Warmington, Hewlett-Packard, Dept. 03153, 19447 Pruneridge Avenue, Cupertino, CA 95014.

HEWLETT PACKARD

50201

LETTERS

BASEBAND VS. BROADBAND

The answer to the first question in your Q&A column [CWOA, Sept. 29], does not provide an understanding of the difference between baseband and broadband. Most assuredly, the difference is not bandwidth. One can construct narrow, medium and wide baseband, and narrow, medium and wide broadband.

What differentiates the network architectures is the scheme for allocating a given channel width over time to multiple processes. Baseband allocates the whole channel for short intervals of time to one process, then to another. The allocation may be preplanned, using a token passing approach, or random, using a collision-detection approach. Broadband allocates subchannels (frequency ranges) to separate processes for long time intervals. Each subchannel may be used continuously by one process or shared over time among multiple processes.

There is no "extra" bandwidth with broadband — just a different channel allocation architecture — the effectiveness of which depends on bandwidth and time domain requirements of processes to be serviced by a network.

Malcolm A. Beers
Management Services Division
Eastman Kodak Co.
Rochester, N.Y.

ON VIDEO DISKS

The statement, "Consumers who buy prerecorded disks can play back the digitized sound and images," in "Video Disks," [CWOA, Sept. 29], promulgates a popular misconception that video disks are digital. They are not. Although the particular form of optical-disk technology used to manufacture video disks can be adapted to the storage of digital information, both the picture and sound informations recorded on consumer video disks are frequncy modulation encoded.

This analog encoding method was invented in the late 1930s by Major E.H. Armstrong. It is the basis for all FM broadcasting and has enjoyed widespread use in television tape recording since its commercial beginning.

When examining a video disk with a microscope, one sees a series of pseudogrooves containing "pits." Since these pits have a code-like appearance, it has been incorrectly assumed by many that video disks are digital. This illusion is created because the pits seem discrete, a characteristic readily associated with digital information. However, while discrete in amplitude, the pits on a video disk are not discrete in duration. The duration varies continuously in accordance with the recorded information, a characteristic that identifies all analog encoding methods.

The above misconception is understandable and certainly forgivable, but it has already caused a great deal of confusion in the industry — not only technically, but with regard to commercial application and industrial impact.

Thomas G. Stockham Jr.
President
Soundstream, Inc.
Salt Lake City, Utah

SECURITY AND OA

You've done it again! You have come out with an excellent coverage of office automation in the Sept. 29 issue of *Computerworld OA* — your third consecutive time. Most notable to me was Jerome Lobel's informative article, "Security." Too often, a publication like yours will stress advantages of automation, but completely neglect the security requirements so necessary in systems that are inundated with highly proprietary information.

For example, we are currently exposed to a rash of information concerning teleconferencing and videoconferencing. Unfortunately, little or no mention is made of the fact that information exchanged in high-level conferences is virtually ultrasensitive proprietary data in its totality and must be protected.

Thank you for the reader-oriented, comprehensive publication geared to create greater understanding of OA. And especially for not letting the security aspect of OA slip by the wayside.

T.B. (Ted) Singer
Security Consultant
T.B. Singer, C.P.P.
San Antonio, Texas

INSUFFICIENT EVIDENCE

The article entitled "Videoconferencing" [CWOA, Sept. 29] may mislead your readers. The "hard-dollar" benefit cited is displacement of travel costs.

The assumption is that videoconferencing decreases travel. This may not be true. Several researchers have suggested there is insufficient evidence to support the contention that there will be a reduction in travel.

Indeed, there may be an increase because the increased communications between individuals may actually increase the need for meetings whose nature is such that face-to-face is the preferred mode.

Raymond W. Beswick
Partner
Warwick Word Processing Consultants Ltd.
Edmonton, Alberta, Canada

CORRECTION

In "A Stitch in Time" [CWOA, Sept. 29], an attribution was not given for the accompanying sidebar, "Bad Buying Practices."

It should have been attributed to Jesse Berst, Redondo Beach, Calif.

COMMENT

Things may never be the same again.

While no skyrocketing growth or revolutionary events marked the office automation industry this year, 1982 nevertheless foreshadowed the shape of things to come. What emerged was, first and foremost, the onslaught of personal computers for the office — both in terms of vendor offerings and end-user interest. Information centers became more prevalent, the need to increase computer literacy through more widespread training methods was evident and products proliferated as vendors crossed over into OA.

Computing is spreading into the end-user community, but the manner in which most people work has not yet been greatly affected. What is being changed is the role of the MIS manager — he is now responsible for OA as well as DP. It's not like the old days when DPers were ensconced in fortresslike DP centers, speaking a foreign language to awed and grateful users and executives. This year's MIS manager was expected to know as much about the organizational side of the business as about DP. What's more, as responsibilities broaden, budgets no longer get the automatic nod of approval they used to receive. Top management now expects you to increase productivity, but not before you cost-justify it. Issues, technologies and solutions are no longer clear cut.

This issue, our final one for 1982, provides an analysis of key technologies like electronic mail, graphics and local networks to inform you about what exists today so you can begin building a pathway into tomorrow. We also offer pointers for building a power base in OA, creating computer-literate end users and managing to get noncommunicating pieces of equipment to talk to each other.

This has been a learning year for the industry. Next year could be the year we have to prove ourselves, and we need to be prepared.

You're changing, and we're changing with you. To help you find the right answers to the right questions, *Computerworld OA* will be coming to you more often in 1983, changing from a quarterly to a bimonthly publication, with its first issue on Feb. 23, 1983. Each of the six issues will focus on a specific area, covering organizational planning; workstations; software; personal computers; output technologies and communications.

Happy New Year! We look forward to seeing you next year and more often.

TO OUR READERS

This marks the fourth issue of *Computerworld OA*, *Computerworld*'s quarterly publication that examines the developing OA marketplace. Current CW subscribers will continue to receive the publication as part of their subscriptions. Other readers who want to continue receiving *Computerworld OA* should subscribe to *Computerworld*, using the bound-in envelope and subscription form located in this issue.

ATTENTION READERS

We want to hear your comments — your opinions, suggestions, problems and news regarding technological breakthroughs, equipment failures or office successes. Our stories are designed to meet your needs, so please let us know if you agree or disagree. Also, if a question about OA has been perplexing you, feel free to write to our Q&A Department, *Computerworld OA*, Box 880, Framingham, Mass. 01701.

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5¼" SSDD 16 Hard Sector w/Hub Ring	**3485**	2.34
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5¼" DSDD 16 Hard Sector w/Hub Ring	**3495**	3.09
5¼" SSQD Soft Sector w/Hub Ring (96 TPI)	**3504**	2.99
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SSSD = Single Sided Single Density; SSDD = Single Sided Double Density; DSDD = Double Sided Double Density; SSQD = Single Sided Quad Density; DSQD = Double Sided Quad Density; TPI = Tracks per inch.

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If you mail your order to us and enclose prepayment, deduct $1.00 per reel from our quantity 100 prices. This means Memorex 25JW can be as low as $12.99 in 100 quantities. Memorex Computer Tapes are packed 10 tapes to a carton. Please order only in increments of 100 units for quantity 100 pricing. Quantities less than 100 units are available in increments of 10 units at a 10% surcharge. **Quantity discounts** are also available. Order 500 or more tapes at the same time and deduct 1%; 1,000 or more saves you 2%; 2,000 or more saves you 3%; 3,000 or more saves you 4%; 4,000 or more saves you 5% and 5,000 or more tapes earns you a 6% discount off our super low quantity 100 price. If you need further assistance or information to find the tape that's right for you, call the Memorex Computer Tape Technical Support Group at (408) 987-2937.

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Memorex IV 2400 feet Easy Load II Cartridge	**25JR**	14.99
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Memorex Quantum 2400 feet Wrightline Seal	**27JW**	16.20
Memorex Quantum 2400 feet Easy Load II Cart.	**27JR**	16.99
Memorex Quantum 1200 feet Wrightline Seal	**27FW**	12.50
Memorex Cubic HD 2400 feet Wrightline Seal	**39JW**	18.99
Memorex Cubic HD 2400 feet Easy Load II	**39JR**	19.99
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CMD-16 "Phoenix Type" CDC Cartridge	**98-26600-31**	160.00
NCR Cartridge	**98-26600-32**	160.00
Mark VIII 80 MB. Error Free	**72-16600-03**	330.00
Flag Free	**72-26600-03**	320.00
Mark XI 200 MB. Error Free	**03-35041**	720.00
Flag Free	**03-35031-02**	560.00
DEC Flag Free	**03-35031-03**	560.00
Mark XII 200 MB. NCR/CDC Flag Free	**03-39001-01**	515.00
Honeywell Flag Free	**03-39000-01**	515.00
Mark XIII 300 MB. Error Free	**03-47021**	795.00
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NEWSBRIEFS

PITTSBURGH, PA. — DR. BRIAN REID, CREATOR OF THE SCRIBE TEXT PROCESSING AND DOCUMENT PRODUCTION SYSTEM, HAS BEEN NAMED WINNER OF THE 1982 GRACE MURRAY HOPPER AWARD by the Association of Computing Machinery (ACM).

Recent winners of the award, given in recognition of major computing achievements made by individuals under 30 years of age, have included Daniel S. Bricklin for Visicalc, Robert M. Metcalf for Ethernet and Stephen Wozniak for the Apple Computer. The award was presented to Reid at the recent ACM annual conference. He was cited for his work in developing the easy-to-use formatting system, which permits novice users to produce final, camera-ready documents. The award includes a cash prize donated by the Univac Division of Sperry Rand and was designed to encourage the achievements of younger computer scientists.

WALTHAM, MASS. — HONEYWELL, INC. HAS LAID OFF 1,850 EMPLOYEES IN ITS SECOND STAFF REDUCTION THIS YEAR. Last January, Honeywell laid off 1,150 employees. The new layoffs will be in white-collar staff and indirect support functions including finance, administration, marketing and sales. The cuts were necessary to improve Honeywell's competitive position in the information systems marketplace, a company spokesman said.

RICHARDSON, TEXAS — ECS TELECOMMUNICATIONS, INC. HAS CHANGED ITS CORPORATE NAME TO VMX, INC. The new name directly reflects the company's primary product, the Voice Message Exchange, according to founder and chairman of the board, Gordon Matthews. The privately held company was founded in June 1978.

FRAMINGHAM, MASS. — THE MARKET FOR OFFICE AUTOMATION EQUIPMENT WILL REACH $11.2 BILLION IN 1986, according to International Data Corp.'s (IDC) recent report entitled "Office Automation Equipment Markets 1982."

The report covers five major OA markets: copiers, facsimile, PBX, electronic typewriters and word processors. While these areas do not include the entire range of OA equipment, they do constitute a significant portion, according to IDC. Word processors and electronic typewriters will show the most dramatic growth over the period, the report indicated. Written for clients of IDC's Corporate Planning Service, the report is also available to nonclients for $3,500 from IDC at Five Speen St., Framingham, Mass. 01701.

TROY, MICH. — EMPLOYERS ARE EXPERIENCING FEW EMPLOYEE PROBLEMS AS A RESULT OF THE INTRODUCTION OF AUTOMATION, research by Research & Forecast, Inc. for Kelly Services, Inc. has found. No personnel problems were encountered after the arrival of automated equipment, 82% of those surveyed said. Although 58% reported apprehension prior to the introduction, almost all of the users' fears were allayed by training (21%) and hands-on-experience (61%). Four out of five companies said they trained their own staff to become technicians, and 71% did so for their managers. Of the 95% that already own WP equipment, 67% have a standalone word processor with separate printer, 65% use electronic typewriters with memory capability and 55% use DP equipment with WP capabilities. A third of the respondents maintain a centralized pool for their WP operations while 52% are decentralized; 15% use both approaches. More than half the respondents stated capacity or capability was the prime equipment consideration, followed by price/cost effectiveness and then adaptability and ease of operation.

NEW YORK — TWO OF XEROX CORP.'S TOP OFFICE SYSTEMS DIVISION EXECUTIVES HAVE RESIGNED TO START THEIR OWN FIRM, causing Xerox to realign three other executives.

Donald J. Massaro, Xerox' controversial vice-president and chief of its Office Systems Division, and David E. Liddle, vice-president and general manager of the division's strategic business unit, have founded a firm called Metaphor Computer Systems, Inc. in Santa Clara, Calif. The giant copier company had reorganized its Office Products Division last July (CWOA, Sept. 31) to separate standalone office products from network-based office automation systems. The two resigning executives stated their decision was made independent of the internal policy of Xerox.

In their stead, Xerox appointed William T. Bayer to the new position of senior vice-president of operations for the Information Products Group, which includes the Office Systems Division. Robert J. Ruebel was appointed senior vice-president of office systems marketing and John F. Shoch was named vice-president of the division.

NORWALK, CONN. — DEMAND FOR LOCAL NETWORK INTERFACES WILL MORE THAN DOUBLE IN THE NEXT TWO YEARS, according to a report from International Resource Development, Inc. (IRD) Although only about 15% of today's personal computer users are equipping their models with modems

NEWSBRIEFS

or other data interface devices, this will soon move up to 100%, according to IRD.

"Network Interfaces for Personal Computers and Office Workstations" costs $1,850 and "Microcomputer Aftermarkets" costs $985 from IRD at 30 High St., Norwalk, Conn. 06851.

RIDGEFIELD, CONN. — A SENIOR MANAGEMENT ROUND TABLE HAS BEEN FORMED, WHICH WILL BE HELD VIA AUDIO TELECONFERENCE. The series of five meetings spread throughout 1983 will host a different guest authority in the field of office automation. Organized by N. Dean Meyer and Associates, Inc., the first meeting will take place in February without a need for speaker or "attendees" to leave their own offices. Organizations interested in joining an Office Automation Teleforum group should contact Dean Meyer at (203) 431-0029.

SUNNYVALE, CALIF. — OFFICE AUTOMATION USERS FEEL THAT THEY ARE SELDOM CONSULTED ABOUT EQUIPMENT UPGRADES, REPLACEMENTS OR PURCHASES, AND THAT THE DECISION MAKERS — TOP MANAGEMENT — LACK FAMILIARITY WITH SYSTEM OPERATIONS AND USER NEEDS, according to a survey by Verbatim Corp. Of the 1,263 respondents, more than three-fourths agreed that automation increased productivity and that WP equipment was the highest contributor. More than two-thirds of the respondents had health reservations about word processing equipment, however. These concerns related mainly to eyestrain (63.4%) and backstrain (36.3%). Nearly 80% called for better lighting and periodic rest breaks. A summary of the survey is available from Verbatim through the Corporate Communications Department, 323 Soquel Way, Sunnyvale, Calif. 94086.

WELLESLEY, MASS. — LOCAL-AREA NETWORK SHIPMENTS, EXCLUDING THE CONNECTING DEVICES, WILL REACH MORE THAN $1 BILLION BY 1990, according to a Venture Development Corp. report. The report presents three possible scenarios for the local-area network market's development and the market projections for each. The first scenario assumes the market will standardize on a particular configuration, the second assumes a variety of technological breakthroughs creating a highly competitive environment and the third assumes vendors will offer special networks that connect only to their own devices. The report also includes an analysis of network technologies. Information about the report, "Local-Networks: A Strategic Analysis 1981-1990," is available from the firm at One Washington St., Wellesley, Mass. 02181.

BOSTON — A SERIES OF SIX REPORTS COVERING VARIOUS OA TECHNOLOGIES IS BEING MADE AVAILABLE TO USERS AND VENDORS from Automated Office Systems, the publishing division of The Office Systems Consulting Group, Inc. Topics to be covered include marketing support, stand-alone word processors, shared-resource word processors, electronic typewriters, OA systems and personal computers for WP and OA applications. The entire series is priced at $1,500, and individual modules are available for $295 each. More information can be obtained from the company at 10 Milk St., Boston, Mass. 02108.

PALO ALTO, CALIF. — HEWLETT-PACKARD CO. HAS CONSOLIDATED TWO DIVISIONS INVOLVED IN THE MANUFACTURE OF COMPUTER TERMINALS AND PERSONAL OFFICE COMPUTERS AND HAS FORMED A SECOND NEW DIVISION FOR TERMINAL MANUFACTURING.

The Personal Office Computer Division was formed through combining the Data Terminals Division in Sunnyvale, Calif., and the General Systems Division, which was previously in Cupertino, Calif. The new division will be based entirely in Sunnyvale. It will be responsible for the HP 125 personal office computer and the HP 2385 executive workstation, as well as future personal office computer line products.

The Terminal Manufacturing Divison will be in Roseville, Calif., and was formed from terminals manufacturing activities under the direction of the Data Terminals Division. The new division will be responsible for a variety of HP terminals used for data entry, word processing, decision support and graphics applications.

MENLO PARK, CALIF. — ANNUAL SHIPMENTS OF UNIX-BASED COMPUTER SYSTEMS ARE EXPECTED TO EXCEED THE 100,000-UNIT MARK BY 1985, according to Gnostic Concepts, Inc.'s Unix Information Service.

The total value of domestic end-user expeditures on Unix-related systems and associated software, support and supplies will exceed $5.1 billion in 1985, Gnostic Concepts said. While Unix will remain a strong part of the minicomputer environment, it will have the most presence in the microcomputer market by 1985, Gnostic predicted. More information about the Unix Information Service, which costs $18,000 annually, is available from the firm at 2710 Sand Hill Road, Menlo Park, Calif. 94025. OA

Q&A

I'm trying to choose between a desktop computer and a word processor as my company's first computer (we're pretty small — now). What should I look for in evaluating them?

As a first-time user, you should be especially concerned with training and documentation. Desktop computers often seem less expensive, but this is partly because WP vendors generally offer more extensive training and support service as part of the price.

You will probably need to get some classroom training for your new operators. Because adequate training facilities are crucial to reaching new users, many retail computer stores are setting up training centers as well. Investigate both avenues and be sure to bring along the person who will actually be using the system. Desktop software for word processing is not generally as good as that on word processors, but try out each to get a feel for the difference.

Finally, bring along specific examples of the documents and numbers you want the system to help you process. Make sure the system has the right kind of software available to do the job. Most word processors offer desktop operating systems that allow them to run electronic spread sheet and other frequently used programs, as well as math and records processing programs running under their own operating systems.

Desktop computers all come with WP software. Be sure to find out if WP documents can be merged with your spread sheet or other applications. This is very often not the case and you'll have to rekey information if you want to include it in a document created in a different application.

I am considering an electronic mail service for my department to get our feet wet without too big an investment. What should I look for?

First, check to see that the service being evaluated can handle your existing terminals. Most services handle a wide variety, including word processors and desktop computers that have Ascii communications. If you're going to be renting the terminals, do a little comparison shopping. Dumb terminals rent for about $50 per month.

The second check should be on the service's pricing schemes, which can vary widely. Some services charge by the number of mailboxes, others by the amount of connect time. Mailboxes cost about $60 a month per mailbox. Connect-time charges range from about $15 an hour during business hours to about $5 an hour for nights and holidays. Investigate any additional charges as well.

You should also keep an eye to the future. Does the service come as a software package as well, so that you can go with an in-house system if you want to? If so, will it run on your host computer? Can it be integrated with a data base management system?

Be sure to include an examination of the user interface. A system that is confusing and difficult to learn will hamstring your efforts from the start. Don't ask someone familiar with terminal use if the software and editing features are easy to use — sit a nonuser down and ask his opinion. OA

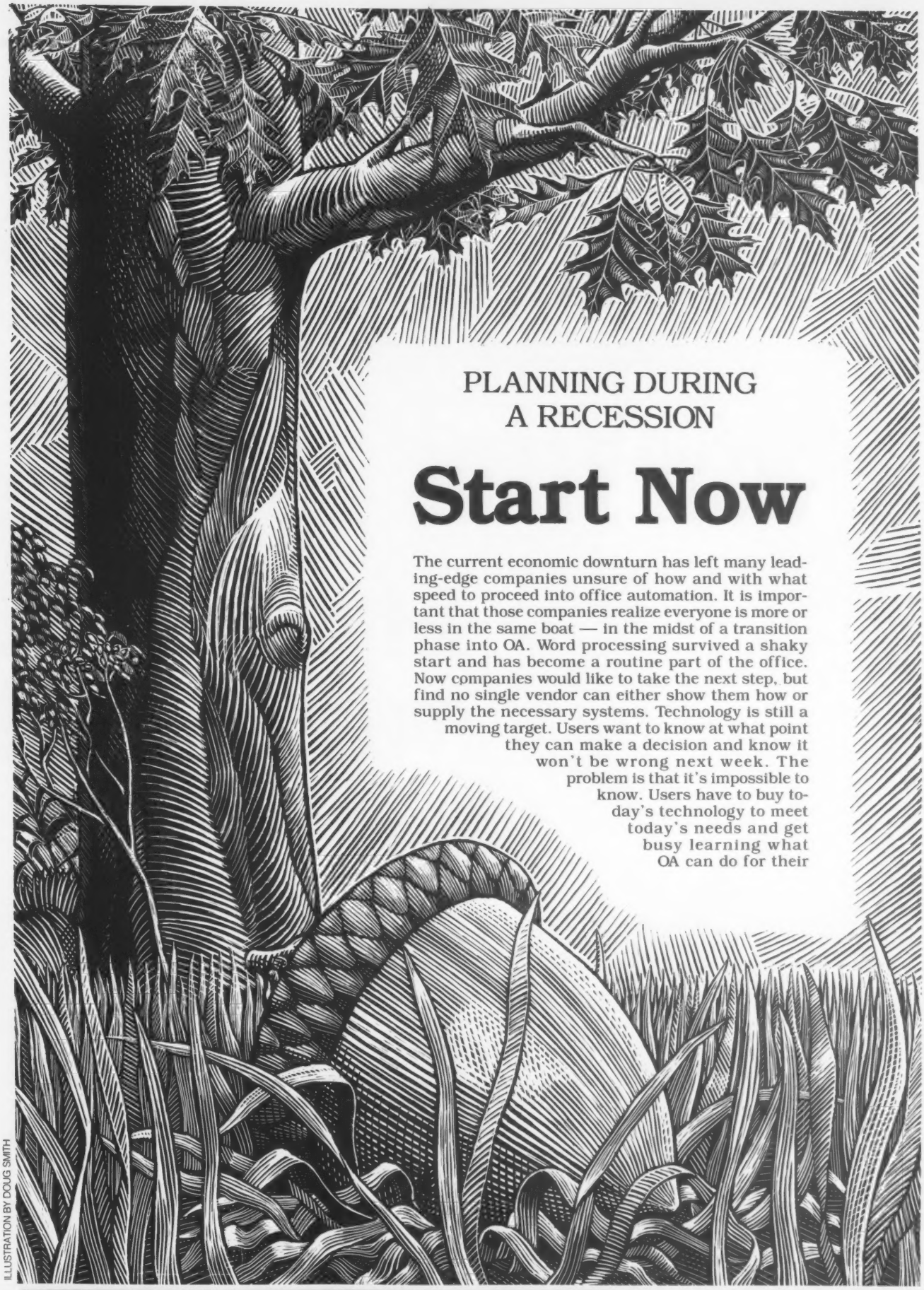


ILLUSTRATION BY DOUG SMITH

PLANNING DURING A RECESSION

Start Now

The current economic downturn has left many leading-edge companies unsure of how and with what speed to proceed into office automation. It is important that those companies realize everyone is more or less in the same boat — in the midst of a transition phase into OA. Word processing survived a shaky start and has become a routine part of the office. Now companies would like to take the next step, but find no single vendor can either show them how or supply the necessary systems. Technology is still a moving target. Users want to know at what point they can make a decision and know it won't be wrong next week. The problem is that it's impossible to know. Users have to buy today's technology to meet today's needs and get busy learning what OA can do for their

BY THOMAS M. LODAHL

particular organizations. Payback periods are short enough, and human learning curves long enough, that users will barely be ready for tomorrow's technology if they start today.

There are other dilemmas. It is now clear that OA can have a tremendous impact on worker productivity in offices, but it is equally clear that we can't yet measure this impact. Managers' costs can be documented, but documenting their worth is more difficult.

The most conservative available estimates indicate that for cost-effective electronic office support, organizations should be spending more than $10,000 to $15,000 per office occupant by the mid-'80s. For large organizations with, for example, 10,000 to 20,000 employees, this amounts to hundreds of millions of dollars. Moreover, OA staffs in these same organizations typically number fewer than 10.

What senior management would think it prudent to let so few people oversee such large expenditures? Without good payback evidence, what capital budgeting committee would even approve those figures? Even if they did, because of the large staff and the long organizational learning times required, you couldn't spend that much money in a year or two anyway.

The final Catch-22: With fully integrated systems, an organization doesn't get the full productivity impact until a substantial majority (at least 80%) of potential users are on the system. Patience and good planning are essential.

On a more optimistic note, however, recent experiences have shown that:

- Basic OA architecture is maturing, even though the technology keeps moving.
- Compared with other ways of increasing productivity, OA is an attractive investment.
- If we start planning now, we might be ready for 1985.

In other words, we can use the current slack to do the planning we knew was necessary, but were "too busy" to do. And we can also launch our organizations on their learning curves; today's learning prepares us for tomorrow's technology.

Let's start by looking at probable architecture in the office of the near future — the mid-'80s. During early 1982, the mists began to clear, giving some indications of the shape OA systems will take by mid-decade. The driving trends are increased power and decreasing costs of microprocessor-based electronic workstations, the decreasing costs and ease of use of magnetic (and eventually, optical) storage and the emergence of local-area networks and digital private automatic branch exchanges for practical networking.

Recent surveys show:

- Users strongly prefer only one screen per desk.
- Mainframe data base access is a must for office systems.
- OA planners expect personal computers to play a key role in the office.

Because different users will need different features, three or four types of terminals will exist at the individual level, ranging from today's dumb ones to powerful 16-bit personal computers with 2M to 5M bytes of storage. Some professionals will use computer-aided design (CAD) devices.

At the establishment level, the system will have to allow mainframe data base access, electronic messaging and support for at least audiographics (nonvideo) teleconferencing.

At the middle or work-group level, minicomputers will integrate work-group facilities (such as printers, FAX, optical character recognition and graphics) and local DP.

Individual workstations will run canned software matched to user needs: text-editing, spreadsheet/analysis/statistical packages and graphics. Ideally, users will never program. The old bugaboo of system degradation under total, centralized time-sharing will be minimized because most work will be done off-line and only finished products will be communicated.

The cost for all this? Individual terminals may range from around $600 for a phone-management system (similar to a Displayphone), to more than $20,000 for a powerful CAD machine. The majority of terminals will be based on 16-bit personal computers and will cost $3,000 to $8,000, with an average expenditure at this level of about $7,000. Add $3,000 for facilities at the work group level and another $1,500 per worker for shared establishment equipment, and you reach a rounded total cost of $12,000. In an organization with 12,000 office people, this adds up to $144 million.

Three problems emerge:

1. Getting the money, which requires productivity evidence.
2. Spending the money at some reasonable rate, which requires a coherent plan.

3. Making sure that what is spent works, which requires good implementation methods and staff.

What do we know now — today — that will help us cope with each of these problems?

The Productivity Gap: What's office automation really worth? To answer this, let's assume that the above basic architecture is in place and everyone who needs access is on the system. What is the total productivity impact of these kinds of systems? Few such systems exist in full-blown implementation, but we can make some educated estimates by means of available evidence from systems approaching this configuration.

The best evidence I've seen comes from the Hanscomb Air Force Systems Command base in Bedford, Mass., where a careful before-and-after study of times and costs of performing standard kinds of work was conducted. That organization oversees the generation of requests for proposals (RFP), supervises the proposal and contracting process, controls vendors and so on — work similar to that done in many corporate office environments. They implemented a Prime Computer, Inc. system, added a graphics system and networked a number of buildings. The system is used by a wide variety of professionals, managers and clerical personnel. Their measurements indicated an overall 20% to 50% reduction in times and costs for similar work after system implementation — quite a leap from the Booz-Allen 15% estimate of three years ago.

Another study, which has not yet been published, was done in an engineering environment with a small Xerox Corp. Alto system, which was the predecessor of the Star/Ethernet. The study indicated similar reductions in the total cost of doing document work. This user company found average reductions across three engineering office environments of around 48% in document costs. In both this case and the Hanscomb case, some of the reductions were due to the elimination of repetitive steps in the work flow (for example, from longhand to typing by the author to word processing and back again for editing). Other reductions resulted from the elimination of unnecessary work or the removal of nonprofessional tasks from professionals' desks.

Both studies were carefully measured and controlled. Both, however, left out the synergistic effects of complete implementations. (In the Hanscomb case, plans for a complete networking implementation are now being carried out). Thus, we would conclude that a system's influence on total organizational performance will net out to be greater in terms of effectiveness (as well as efficiency) gains than the findings of the above two studies indicate.

The synergistic effects I am referring to are things like shorter decision times, better or more informed decisions, higher quality products, better looking proposals, opportunities seized and so on. Most process completion times — for example, the total time needed to get a proposal out — are reduced by half. Most managers I have talked with value the latter more than simple efficiency ("hard-dollar") gains, but they don't believe the controller will buy it.

Where does this leave us? I have concluded from this and other suggestive evidence (for example, from the case of Lincoln National Life) that for a typical office setting, we can expect operational improvements in the range of 25% to 50%. The point at which an organization falls within that range will depend on the nature of the work mix, the fully loaded costs of those performing it and the effectiveness of the implementation.

It is also clear from these studies that the technology won't do it alone, and a sloppy implementation can actually harm performance. Particularly critical are system availability (both access and reliability) and steadfast user support during the learning period.

Viewed in terms of the investment question, a 25% performance improvement is in the Valhalla range. Today, the fully loaded cost of a typical professional (engineer, programmer, MBA or whatever) runs between $80,000 and $100,000 per year. If an impact of 25% of that is accomplished, an organization can get the work of four for the cost of three.

More important, the fully supported professional will be more effective. CAD/CAM studies have shown that performance improvements of 500% are common, but some of the saved time is used to explore more design alternatives, resulting in a better product. Lincoln National cost-justified its multimillion-dollar system based on an overall 6½% performance improvement; Lincoln National is convinced it got far more than that.

Let's put this kind of savings in

a capital budgeting framework: Using the example above, if the fully loaded cost of a professional is conservatively placed at $80,000 and the improvement at 25%, we would realize an annual value of $20,000. Based on an eight-year payback, the net present value of this technology investment at today's interest rates would be $92,600. No one is asking the controller to spend that much. In 1985, $15,000 will do for most professionals; for those requiring heavy graphics or CAD workstations, $25,000. Good deal? Proceed to the next step.

The Planning Gap: If we really want to spend $15,000 on electronic support for the average office worker, careful strategic planning is necessary. The aggregate investments implied are huge, and individual and organizational learning limits will constrain the rate of implementation. User motivation is not a problem: Everyone, even senior management, wants a piece of this technology — if it doesn't hurt.

Adopting a strategic stance toward office technology planning means:

- The technology does not drive the plan. Rather, technology investments must be viewed as part of a total performance improvement analysis, not as a piecemeal or crash program. A key part of the performance analysis, then, deals with how effectively the current investments in human resources are being leveraged and how much improvement might be achieved under various changes: procedural, organizational or technological.
- Current and future business directions must be assessed. A marketing-oriented business might require a different support structure and growth strategy from that needed in a mature competitive environment.
- Attaining effective senior sponsorship, especially in initial goal setting, and ensuring that implementation concerns are built in from the outset of the process.

How do we actually do it? We build involvement with a senior management steering committee, which sets goals and constraints for a plan and identifies key stakeholders and potential members of a planning team. The planning team, in turn, oversees a survey process, in which key segments of the organization are identified and business goals, performance index and information needs and work processes are described.

Based on this data, an opportunity analysis is done, identifying key problems, potential solutions and performance paybacks. This goes back to the steering committee, which then decides whether to proceed with more fine-grained study and analysis and initial system specification. Depending on the nature of the business, an implementation schedule involving prototyping/piloting, diffusion and integration plans would then be constructed as part of a total plan, along with proposed investment schedules, cash-flow projections, pay-back assumptions and staffing/training needs.

A thoroughly strategic approach would involve constant coordination of the OA effort with other productivity improvement efforts, with a view toward creating synergy rather than having them fall over each other.

What's it worth? Done correctly, a strategic OA plan gets senior management understanding and support; creates ongoing commitment to investments, staffing and implementation; focuses relevant competences from key stakeholders; and gets the job done right.

There is still conflict, and the technology is still a moving target. But based as it is on existing business and human resource investments, this OA plan cannot be made obsolete by technology. It can only be improved by providing better leverage for human effort.

The Staffing/Implementation Gap: Now that we have the money and the plan, we have to get things moving. It has become clear that most vendors will not be able to give the kind of support for office computing that they have for DP; heavy competition means the money for that support just isn't there. Users are thus thrown back on themselves (and whatever help they can buy) to make specific decisions on hardware, software, networking strategy and managing the learning process.

Until now, OA staffs have had primarily technical orientations and have worried about setting overall corporate direction on vendor choice, equipment strategies and so on. "User support" mainly meant doing systems studies, cost-justifications and operator training. Now, however, we face the prospect of many professionals and managers using equipment directly; as clients, they will be less patient, more opinionated and crankier than the clerical staffs of old. As a result, we will need to do better analysis, more careful design and customizing and more careful implementation planning.

Technology investments must be viewed as part of a total performance improvement analysis, not as a piecemeal or crash program.

The above remarks do not provide solutions to the fundamental problem: There are too few OA staff available with not enough of the right skills. Most large companies today have one person on the management information systems staff for every 40 to 60 employees. For OA today, the ratio is closer to 1:500, even though OA is recognized as much more human intensive.

Because we cannot yet rely on academic institutions to fill this gap, organizations will have to do their own selection, training and development. They will need technical, managerial, analytic and change-agent skills of the highest order to be able to do the job. Building the intellectual software (methodologies for productivity analysis, planning, user coaching and organizing for implementation and evaluation) thus emerges as a first priority for training and staff building.

This is not the time to sit around worrying about our futures. This is the time to use the present well, so when the recovery (and the technology) comes along, we'll be ready. ♦ OA

Lodahl is vice-president of office strategies at Gray-Judson, Inc. in Boston.

ELECTRONIC MAIL

Phone Home

BY SUSEN S. KAY

Electronic mail is currently being offered by almost every type of company in the data processing field. Hardware manufacturers like IBM, Prime Computer, Inc. and Datapoint Corp. offered systems last year. This year Data General Corp., Hewlett-Packard Co., Four-Phase Systems, Inc. and others jumped in.

In fact, while 21 vendors of computer-based message systems were in the market in 1981, more than twice that number have entered the marketplace this year. One vendor even indicated it felt obligated to offer electronic mail just to stay competitive.

With so much activity in the market, how can a user decide what system is best for his organization's needs? The following is an attempt to spotlight a few of the companies and occurrences in the marketplace.

In addition to hardware companies, computer service firms (also called timesharing service firms) represent a category of companies offering electronic mail. Most of these companies, for example, Dialcom, Inc. and Compuserve, Inc., had their products in the marketplace early. New entries this year include ADP Network Services (Automail) and Infomedia (Jenny).

Software houses are also competing with their own packaged products. Firms that already offer a data base or other major product are beginning to offer electronic mail (such as Applied Data Research, Inc.'s Email) as well. Even government agencies, such as the Advanced Research Projects Agency and the U.S. Post Office are offering electronic mail services.

A few firms, such as National Business Systems, Inc. (Toss), offer electronic mail as their only products. Generally, these offerings were developed for one major client and were then publicly marketed.

Last (but only in order of mention) are the communications firms and their products. Some, like GTE Telenet, have been in the market for some time, and new entries include United Information Services (Unimail) and Cableshare.

Each of these types of firms brings its own orientation to its mail product; many excel in one area but not in others. Matching a company's specialties to your own needs could be critical in the success of your OA system.

Manufacturers have a tendency to be too technical in their functions and interaction with the user. For example, the Prime system requires a user to address memos to a three-character ID, rather than to a user's full name. Similarly awkward, the Datapoint and Honeywell, Inc. systems require users to enter a mail-stop code along with the name.

Computer service firms are generally very "friendly" because of their years of experience working with remote users. Their products, on the other hand, have a tendency to be limited in their ability to expand. Only one system, Dialcom's Intercom, offers an interface capability with other applications.

Software houses and specialty firms have sometimes written their products for one user and then tried to generalize them. This results in a system that has the perspective of the major user. For example, National Business Systems' Toss has some extensive functions like calendaring and even task management, but no file search capability.

Communications firms suffer some of the same orientation as do computer service firms. As a result, a system such as Ontyme-II by Tymnet, Inc. (now moved to the parent company, Tymshare, Inc.) does not offer computer-to-computer capability. You can only "talk" to the people on your system or machine.

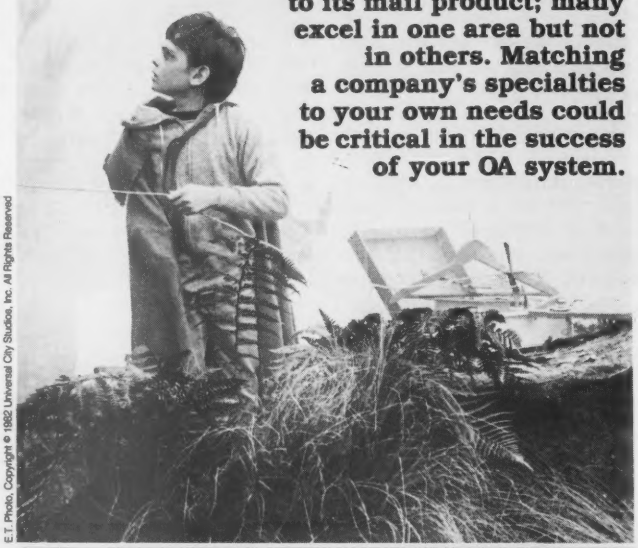
In the area of vendor flexibility, an interesting trend is developing. Each vendor has come on the market with a software package, a turnkey system or a subscription service. But these restrictions are not firm. More and more we see vendors adjust their products to be more flexible to the user environment.

The turnkey products are generally restricted to one kind of hardware because they are usually offered by the hardware manufacturers. But these systems are also offered as software packages for existing systems.

Subscription services are now making their products available as software packages. This is a natural evolution since, if a major user organization starts on a service, it will want to bring it in-house as the usage grows. Thus, some services (at least those that had the foresight to write their systems in standard code) are also selling their electronic mail systems as software packages. And, for the right price, these firms will probably convert their systems to your machine if that proves necessary.

On the other hand, package vendors are finding out that almost no one is going to purchase some pilot or trial. Computer Corp. of America (CCA) realized this early and offered Comet as a subscription service. Other vendors have found small service bureaus an electronic mail system without to run their products. Still others are offering limited or even free in-house trials.

Each of these types of firms brings its own orientation to its mail product; many excel in one area but not in others. Matching a company's specialties to your own needs could be critical in the success of your OA system.



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A wide variety of system appearances is also available. There are menu-oriented systems like Telemail and screen-oriented systems like Omnicom. Some systems, for example, the one from Digital Equipment Corp., also use function keys. Most are evolving to some combination of menu, commands and prompts. This retains the menu friendliness or specific prompt mode, while gaining command-mode speed.

As all these vendors enter the market and more people start using electronic mail, the product itself is undergoing a change. It used to be enough for a mail system to have READ, WRITE and SEND functions. Today, this is no longer sufficient.

The ability to forward and answer a message automatically is almost mandatory in today's market. Early systems, such as the General Electric Information Services Co. (Geisco) and the Xerox Corp. systems, that did not have these functions are now adding them (at least Geisco has added a limited forward capability). New systems almost all have these functions, but some have added a unique twist. For example, in National Business Systems' Toss, users can select a predefined comment to attach to the forwarded document instead of keying in a message (such as #1 for "For Your Information").

Other functions, such as the ability to get a confirmation on a message or the ability to send a confidential message, are gaining popularity. We see these functions implemented in a variety of ways. For example, the ability to send a confidential message can mean that the receiver sees a comment on the message in the in-box (Computer Console's Office Power). Or, "confidential" can require the receiver to enter a special password in order to read the message (Telemail).

Other functions that are becoming prevalent are the ability to store and use predefined forms and a computer-to-computer facility. We see older products, such as CCA's Comet, adding these features and, newer products, such as Honeywell's System, coming to market with these features already.

Electronic mail is becoming more than just a distribution system for documents, memos and messages. (Yes, some vendors do like to complicate things and make a distinction among all these types; some even have separate filing facilities based on type, such as IBM's Profs.) Vendors are beginning to realize that, as in the real world, mail comes from places other than your keyboard (word processors, phone receptionists and computer systems). Mail also goes to places other than to another individual (printers, other computers and other systems such as telex).

Although there are over 40 vendors in the marketplace, no one vendor is really dominant. Individual vendors have had isolated successes with major client firms, but no one has been able to capitalize on that success and repeat it. Most vendors have not sold many systems and no one vendor has or will run away with the market.

From the very beginning, electronic mail has been a deceptive subject. Everyone believes he knows all about it because he has dealt with it in the paper world. This perception has caused a number of vendors to introduce incomplete products. It is surprising that even knowledgeable vendors have not done some market research before announcing their products. Users have also fallen into this trap. Product selection is usually done with a minimum of criteria, and implementation is often perfunctory.

While there is no "best" system on the market, there are about 10 systems in the top rank. One of these is best for each user's environment now and in the future. To become aware of all the potential features, users should learn about the products on the market, even those not directly applicable. Users then must study their own environments and select those functions and features most important to them.

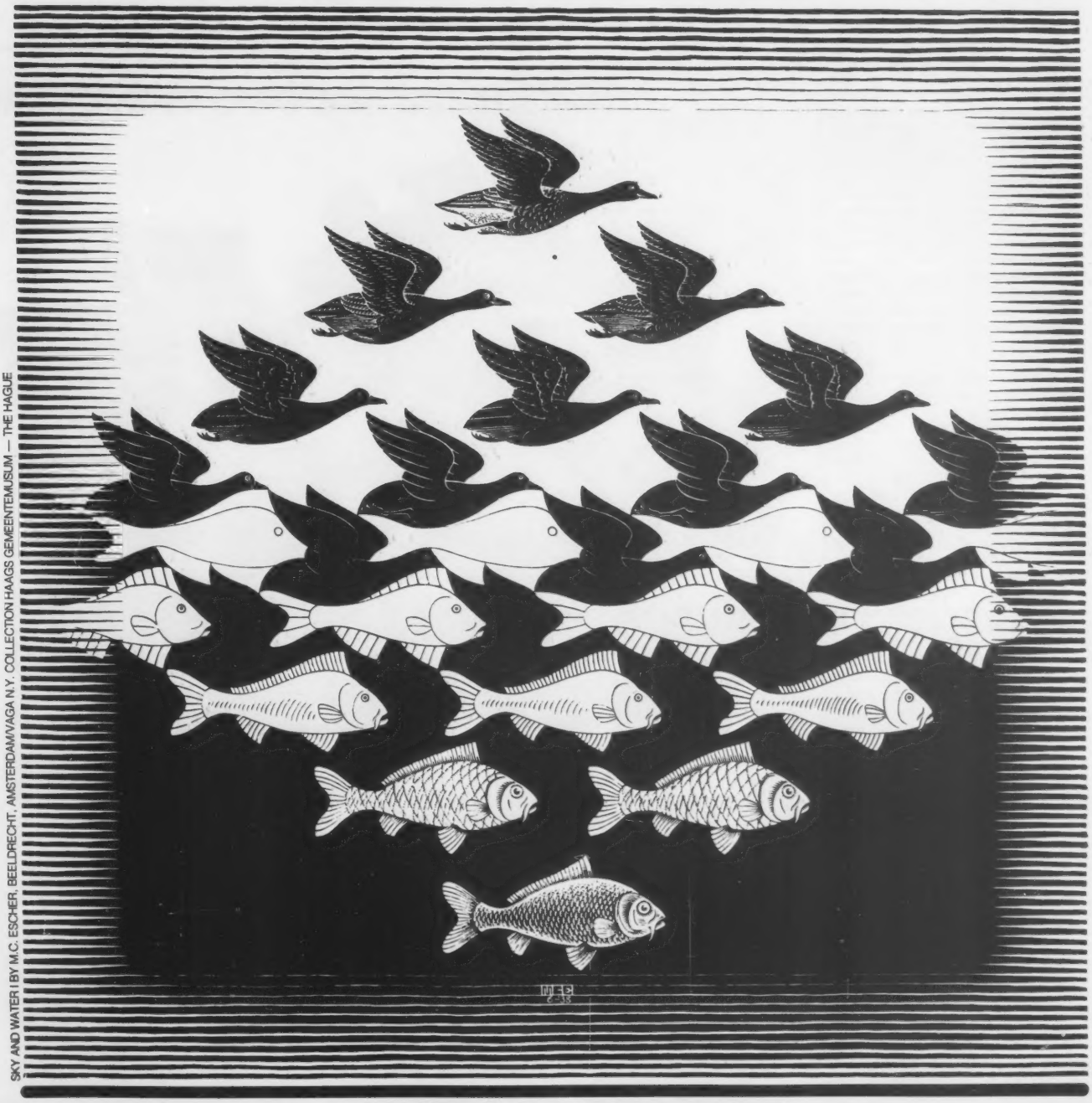
Finally, it is also important to remember that the electronic mail product and the marketplace are changing and evolving. Vendors are continually adding more features as users learn what they need. This process will continue for some years.

Does this mean you should wait to use electronic mail? No! It would take you and your organization at least one full year of usage before you would make use of all the features and functions available today. It is worthwhile to start now to experience electronic mail — just make sure you select a product and vendor that will grow with you. OA

Kay is a senior consultant at Hannagan & Associates, Inc., a management consulting firm specializing in office automation with headquarters in Chicago.

Protocol Conversion

Concern is mounting over the inability of different kinds of equipment to communicate with each other. Increased emphasis on white-collar productivity, the need for rapid access to information, as well as concern for the increased cost of duplicating and distributing hard-copy printouts have focused the office spotlight on electronic technology — specifically on office communications networks. Corporations and federal agencies have come to rely upon word processing and other automation systems for the timely creation, efficient editing and electronic filing of all types of documents. End-user departments have been purchasing stand-alone and clustered terminal equipment for office WP applications at an amazing rate. International Data Corp. has estimated that at year-end 1982, the U.S. word processing installed base will be over 700,000 units, with 1982 shipment values exceeding $2 billion. Much of this acquisition activity has



SKY AND WATER I BY M.C. ESCHER, BEELDRECHT, AMSTERDAM/VAGA N.Y. COLLECTION HAAGS GEMEENTEMUSUM — THE HAGUE

BY THOMAS WILLMOTT

occurred outside the centralized planning authority of the management information systems (MIS) group, at the divisional or field-office level of responsibility. In fact, multiple OA vendors are represented in most large organizations.

MIS departments and office systems planners are discovering that an office communications network project — one that permits dissimilar pieces of equipment to talk to one another — is a nontrivial task. A local sales office may have just purchased NBI, Inc. equipment, while marketing has installed a Wang Laboratories, Inc. Office Information System for headquarters operations. Perhaps the legal department purchased CPT Corp. stand-alones because the time and billing software was appealing. The manufacturing division, on the other hand, might have a good working relationship with Digital Equipment Corp. or IBM. Add to this multiplicity of hardware the fact that WP and OA vendors have all developed their own communications protocols, and the issue of moving text files from one environment to another is quickly complicated.

It is possible, of course, for the advanced office or MIS planning group to eliminate existing incompatibilities either by trading and physically rearranging word processors or by simply migrating all groups to similar equipment. For example, in some large or decentralized organizations, it may not be necessary for one operating unit to transfer files, memos or documents to another on a daily or even weekly basis. Therefore, if like equipment exists within each division or at the points of greatest information flow, communications problems are solved without need for any conversion application. In this way, departments requiring large-volume communications will have access to the same vendor's communications protocol.

Although end users may object to a loss of autonomy in the selection and procurement process, and although the issue of end-user independence must be handled sensitively, several large federal agency and Fortune 1000 long-range planning groups have decided that this kind of purification process is the only cost-justifiable approach to office communications.

Having implemented this high-volume, like-vendor strategy, the organization might then use standard TTY or 3780 handshake communications protocols or, perhaps, optical character recognition equipment for unusual, one-time file and document transfers. TTY/Ascii-type standards, which are still the norm for most asynchronous, character-by-character terminals and personal computers, are often the common denominator for this process. These will strip away many WP control codes, including header information, tabs, word wraps, centers and indentations. The control codes are not necessary for transmitting data or text from one location to another. However, without them it is nearly impossible to edit material at a receiving station. Typically, TTY or 3270 communications protocols will produce a frozen print image of the text.

When the print-image capability is not sufficient for the requirements of the application and when an organization decides it has no choice but to implement a multiple-vendor network, there are fundamental, technical aproaches to the problem of protocol conversion that may be divided into three broad categories:

- Simultaneous communications translation.
- Disk-to-disk conversion.
- Computer system store and forward.

A number of vendors compete in this marketplace with variations on these three system designs. Here is a look at several currently in the market.

One approach is to use a simultaneous "black box" converter

If like equipment exists within each division or at the points of greatest information flow, communications problems are solved without need for any conversion application.

such as the Model 303 Protocol Translator, designed and manufactured by Racal-Telesystems, Inc. of Chicago. The Model 303 connects two word processors, which may either be hardwired in the one location or may communicate via dial-up lines and modem. Material prepared on the first system is transmitted through the Model 303 to the memory of the second, where it can be called up for further editing, printing or, perhaps, retransmission to the original terminal.

The Model 303 is an on-line, real-time, simultaneous communications protocol converter. The device translates each data or control code character as it is transmitted from the memory of the first system to the memory of the second, using conversion tables and buffer memory. The Racal-Telesystems 303 is not, however, a communications controller and it does not have the capability to direct sophisticated routing of files. The Model 303 accepts as input the codes of one processor and, as closely as possible, it outputs the codes of a second.

"A user with potentional conversion applications should check each vendor's documentation carefully. Ask for specifications on what will and what won't be possible, or be prepared for disappointments."

Aside from the obvious use of this translating device for interoffice communication, there are other potential applications. In one West Coast law firm, Racal-Telesystems has delivered a system that allows six Vydec, Inc. word processors to communicate with an IBM 6670 printer. This type of conversion project can have dramatic impacts on shared resource networks as well as the cost-effectiveness of installed office equipment. Such devices can expand the capabilities of existing hardware at relatively low cost.

According to Pat Raftery, national sales manager for Racal-Telesystems, it is only within the last year or so that word processing users have begun to take full advantage of their systems' communications capabilities and even more recently that the problems of conversion to dissimilar devices have surfaced. There is an information gap on this topic in the industry. Raftery recommends that a user with potential conversion applications check each vendor's documentation carefully. "Ask for specifications on what will and what won't be possible," he said, "or be prepared for disappointments." This is still a market in which the prospective client must be cautious in his research work.

A second approach to the problem of dissimilar WP equipment is disk-to-disk conversion, exemplified by the Altertext, Inc. System Two. As a service bureau, this Boston-based firm has been offering one-time or large-project WP conversions for several years. However, Altertext recently announced the availability of desk-top disk-to-disk systems based upon a universal controller board of its own design.

The 280 Controller Board is capable of interpreting a variety of diskette formats, such as single-sided, single-density 5¼ in. or double-density 8 in., and various types of formatting control procedures and recording techniques. The 280 Controller Board adjusts to diskette formatting inconsistencies while the software programs supply data and control code conversion tables. According to Tom Roberts, president of Altertext, this approach allows the firm to react quickly to new releases of communications software without having to alter the basic design of its Disk Reader System.

There are two models of the Altertext Disk Reader. Model One is delivered with a CRT, keyboard, one 8-in. and one 5¼-in. disk drive, plus four read/write programs targeted for specific word processor vendor environments. Disk Reader System One is connected via phone lines to the transmitting WP system. The Disk Reader accepts input, translates the codes and writes the new file to diskette. The Altertext Model Two includes two additional

disk drives and thus offers an actual read and write diskette-to-diskette capability.

For the large user intending to migrate from one vendor's WP equipment to another's, the disk-to-disk translation approach is appealing. One large problem is immediately solved, that of how to capture material that has been archived to diskettes without having to rekey information on the new system's terminals. It is also possible in a disk-to-disk conversion strategy to save on communications costs by moving data from one disk to another in a central location and then distributing the disks by mail or other transportation vehicle.

Like several of the vendors now competing in the conversion market, Altertext has experience in the WP to phototypesetting business. The original Altertext code, for example, translated WP files to a Mergenthaler Linotype 202 typesetter. A large segment of this conversion market is still dedicated to photocomposition firms that wish to offer a WP interface to their clients. Other firms with heavy emphasis upon conversion to photocomposition include G.O. Graphics, Inc. of Lexington, Mass., and Shaffstall, Inc. of Indianapolis.

A third protocol conversion strategy is to develop computer-based applications programs that not only translate character and formatting control codes, but also employ the resources of a computer and its peripherals for additional archival and communications routing functions. Such an approach has been taken by vendors such as Integrated Technologies, Inc. in Haverford, Pa.

The Integrated Technologies offering, Softswitch, attacks the protocol conversion problem in three ways, according to its president, Michael Zisman. The product uses tables and program code to translate files and then transmits them to a target disk "as if they had been keyed there." Using a generalized document storage technique, the computer's disk subsystem is used for additional archival capacity. And finally, Softswitch offers a broadcast, document-routing capability.

Computer store-and-forward methodologies are based upon nonsimultaneous communications. This means simply that text is translated into a generalized form for storage in the mainframe computer. Broadcast or routing of the document then occurs as a separate, time-distinct function. The Softswitch product is menu-driven and intended, as are other vendors' products, for conversion applications that require full edit-level compatibility.

In the case of a user with a large network of WP and computer equipment, the computer store-and-forward approach can be a particularly effective conversion strategy. It allows WP devices to be used for large system messaging and, therefore, might eliminate some duplication of terminals and hardware. For companies with rigorous or heavy-volume communications requirements, a computer-based conversion strategy can deliver high-volume internal communications even in multiple-vendor environments.

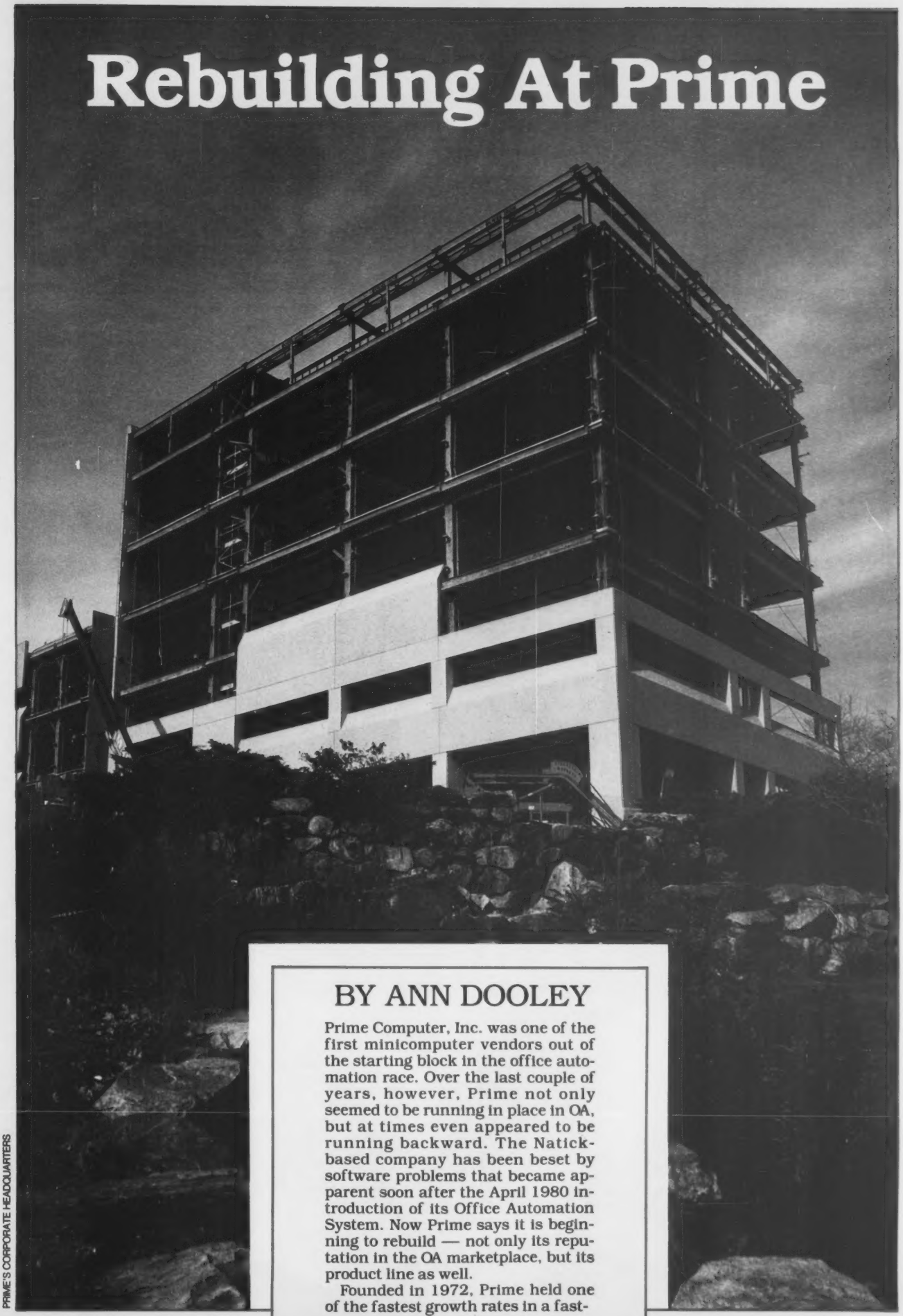
For the large user with different vendors' equipment, disk-to-disk translation is appealing.

The rapid proliferation of WP equipment has led inevitably to multiple-vendor representations and to communications incompatibilities. Volume shipments of personal computers for data collection and departmental text transfer suggest that in the not-too-distant future these devices will also require access to the organization's distributed resource network.

Given the need for shared information, the issue of word processing protocol conversion and vendor-to-vendor communications will continue to be critical to the outcome of advanced office planning. It is timely access to information and effective distribution strategies that are at the heart of the office of the future. Clearly, advances in interfacing dissimilar equipment will play a large role in achieving these goals. OA

Willmott is client services account manager at International Data Corp., a Framingham, Mass.-based research and consulting company.

Rebuilding At Prime



PRIME'S CORPORATE HEADQUARTERS

BY ANN DOOLEY

Prime Computer, Inc. was one of the first minicomputer vendors out of the starting block in the office automation race. Over the last couple of years, however, Prime not only seemed to be running in place in OA, but at times even appeared to be running backward. The Natick-based company has been beset by software problems that became apparent soon after the April 1980 introduction of its Office Automation System. Now Prime says it is beginning to rebuild — not only its reputation in the OA marketplace, but its product line as well.

Founded in 1972, Prime held one of the fastest growth rates in a fast-

growing industry, with revenues doubling most years and profits actually tripling in many years. In fact, from 1975 through most of 1980, Prime experienced a reported growth rate of 91%. But the first years of the new decade brought changes for Prime. In July 1981, the company's president and chief executive officer, Kenneth G. Fisher, unexpectedly resigned. The resignation — generally assumed to be the result of a power struggle between Fisher and David J. Dunn, chairman of Prime's board of directors — sent shock waves through the industry. Several of the company's top executives who had been with the company from its beginning also have left during the last few years.

In 1980, the time of Prime's entry into the OA market, white-collar productivity was not the industry rallying cry it is today. Prime was notable as one of the first vendors to market an OA product to the professional and manager, rather than to the secretary. This farsightedness was particularly astute because Prime did not enter the OA market with a thorough product background in the office environment.

Unlike other 32-bit architecture mini vendors, Prime targets its sales predominantly to the end user, concentrating on the large, Fortune 500 multilocation corporations. Prime's Office Automation System — until recently the company's only real OA offering — was designed to run on any Prime 50 series minicomputer. It consists of three separate software modules: management communications and support, word processing and advanced text management.

The system received complaints from its users almost immediately upon introduction. The software, bought from a New York-based software company, was found to hold a number of glitches. Prime found itself with "massive software problems," according to Tom Billadeau, president of the Office Systems Consulting Group; he added that that kind of bad reputation is difficult to counteract.

Prime acknowledged the software bugs and said it has spent its time cleaning up the coding problems. "We've been working very hard to stabilize and improve what we had," G.E. Rodts, director of Prime's Industry and Office Systems, stated. "Prime would have been more visible and aggressive in the OA market during this whole period if we had not had these problems."

But Prime has not been the only company in this bind. In an immature market, the desire to announce ahead of the competition is always very strong, Rodts noted. "In some degree that was an overreaction, but one which is behind us now."

Molly Upton, a long-time industry watcher and the editor of International Data Corp.'s (IDC) *Office Automation Reporting Service*, agreed and added that almost anything that is first out will have bugs, and will get knocked accordingly.

While Prime was in a reassessment and regrouping period, speculation began to surface about whether the company would continue its commitment to the office. It was essential that Prime maintain its position, according to industry watchers, in order to keep pace with all its major minicomputer rivals who had since introduced products for the office. The question even arose whether Prime was switching its attention away from office technology and toward computer-aided design and manufacturing, an action Prime vigorously denied. According to Rodts, both technologies play a critical role in the company's overall strategy.

The consensus in the marketplace is that now is the time for Prime to visibly turn itself around. "The company needs to introduce a full-featured

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product in the next year to recoup its losses," David Terrie, senior analyst at IDC, said. Areas in which Prime needs to patch up its product line are obvious: The company currently has no product to compete against the proliferation of personal computers, it needs more real ammunition in the area of the professional workstation and it needs more robust software.

"Prime was stagnating" for a time in OA, Rodts acknowledged, but denied it was through any lack of commitment. The company was reluctant to expand its product line because there was some level of dissatisfaction. "Our game plan is to get products well stabilized and make sure we have a high level of satisfaction before taking off in another direction. We had some work to do and, in fact, we've just announced the third release of the product, which will be delivered in February."

In terms of the future, Rodts — a newcomer to Prime of four and one half months — maintained the company's commitment would be visible in its marketing and products within the year. "We will categorically stay in the business and get very aggressive." Proof of Prime's claim is the recent introduction of its 2250 32-bit computer system, which is generally considered to be a step in the right direction. The 2250 provides a smaller system for users looking for small pilots by bringing a company's departmental costs down, according to IDC's Upton.

However, the 2250 should be considered only a first step. If a company cannot offer full-functioned WP, it needs something dynamic, Billadeau said. Digital Equipment Corp. is selling that with the All-in-1 and Prime is in the same boat, but a little further from shore, he noted. In the fight for market recognition, Prime has in its corner the high quality support the company has traditionally offered, a visible name and a substantial installed base. Prime also is said to offer user-transparent products, good communications and total software compatibility. Prime missed out when it failed to address purchase-decision issues and concentrated instead on those areas that are nice but only secondary considerations in a purchase decision, he admonished. To be a viable force, Prime needs to have tangible end-user oriented items.

On the other hand, Prime is "out of the blocks ahead of DEC, for instance, on a top-end machine," financial analyst Don Brown, vice-president at Prudential Hache, remarked.

The task ahead for Prime is to enhance its existing products by adding graphics, for instance, as well as offer something new to users. If the company can do this, it has a good chance of penetrating its existing customer base and extending it, predicted Amy Wohl, consultant and president of Advanced Office Concepts, Inc. In terms of strategy, Rodts indicated that Prime plans to improve its WP capabilities and strengthen its already strong communications and network capabilities, particularly its Prime Ring Net and public network links such as The Source. Ease of use and applications integration are two other areas to be addressed.

Although Rodts would not comment on what specific products the company is focusing on, he stated that personal computing (as opposed to personal computers), professional workstations and data base management systems connecting to a host are all Prime possibilities.

While contending that Prime was in no short-term disadvantage in relation to competitors, Rodts did admit the company would have to provide capabilities users are flocking to, or it could fall victim to long-term gains by other companies. Even though it was burned on its OA software in the past, Prime plans to follow a combination of alternatives philosophy by intensifying its activities with outside software firms through joint marketing agreements for application software written on Prime systems.

Prime views DEC, Hewlett-Packard Co. and IBM as its chief competitors, but feels it holds an advantage over them because of its wide family of computers, from the current low-end 2250 to the high-end 850, all running under one operating system.

Prime, in fact, appears to have come out of its slump. The company had a 16% gain in net income during its third quarter this year, and sales climbed 18% to $109.2 million. Nine months earnings equaled $32.7 million or $1.08 per share, compared with $27.2 million or 91 cents per share in 1981.

Analyzing Prime's future in the OA market, Wohl said the company is acting as though it intends to come on strong in the OA marketplace, although "nothing they've done so far would convince us of that." Billadeau also noted that, if the company has really taken care of its software problems and also comes up with a strong front end and a major delivery item, it could do well. (Prime has reportedly been seeking to buy an interface and has approached Syntrex, Inc. and other WP vendors, the latest of which is reportedly Convergent Technologies, Inc. This would qualify as a major delivery item.)

An important factor to remember, however, is that two years ago, when Prime made its major move into OA, it did not have a DEC or Data General Corp. to compete against. Prime has lost that initial competitive edge. OA

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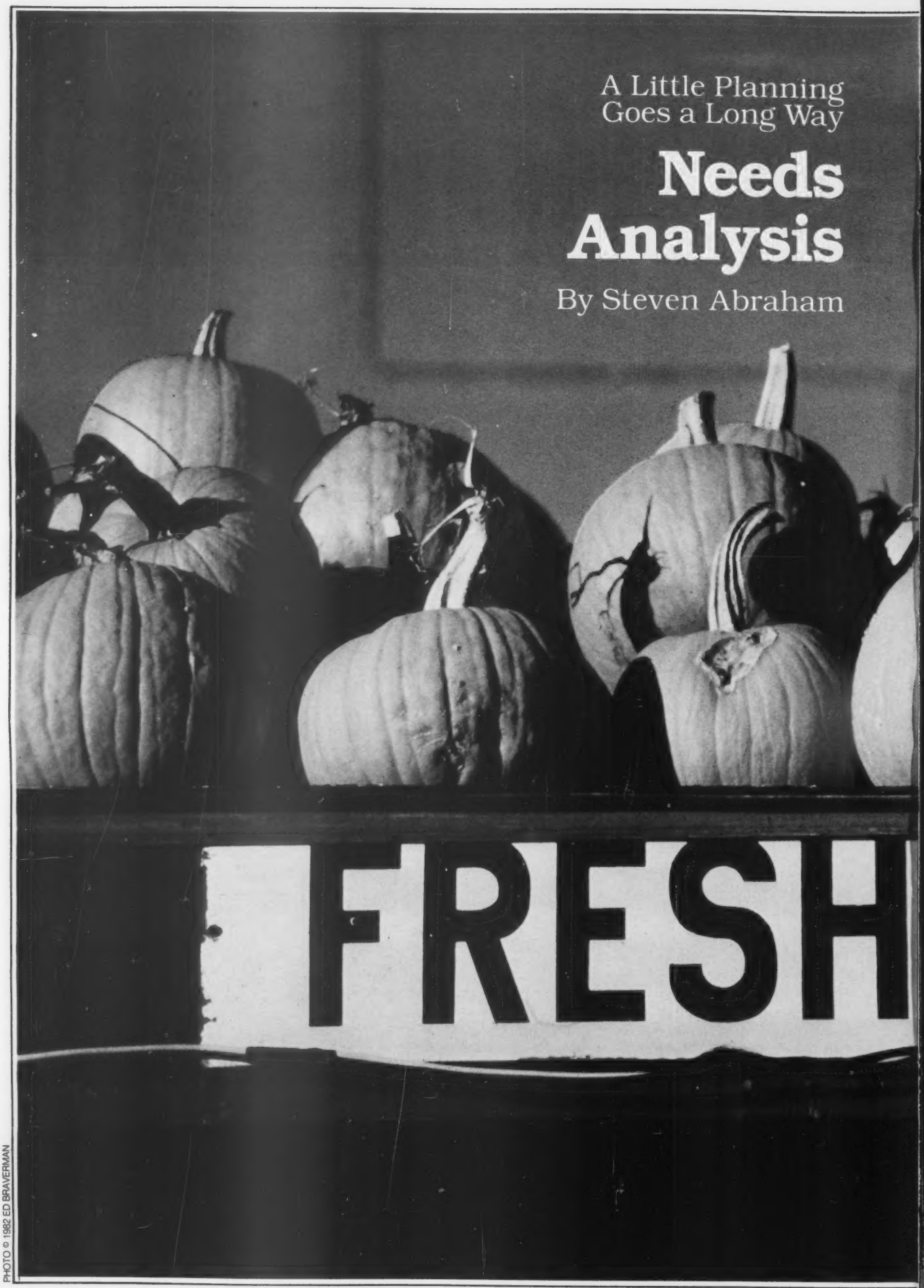
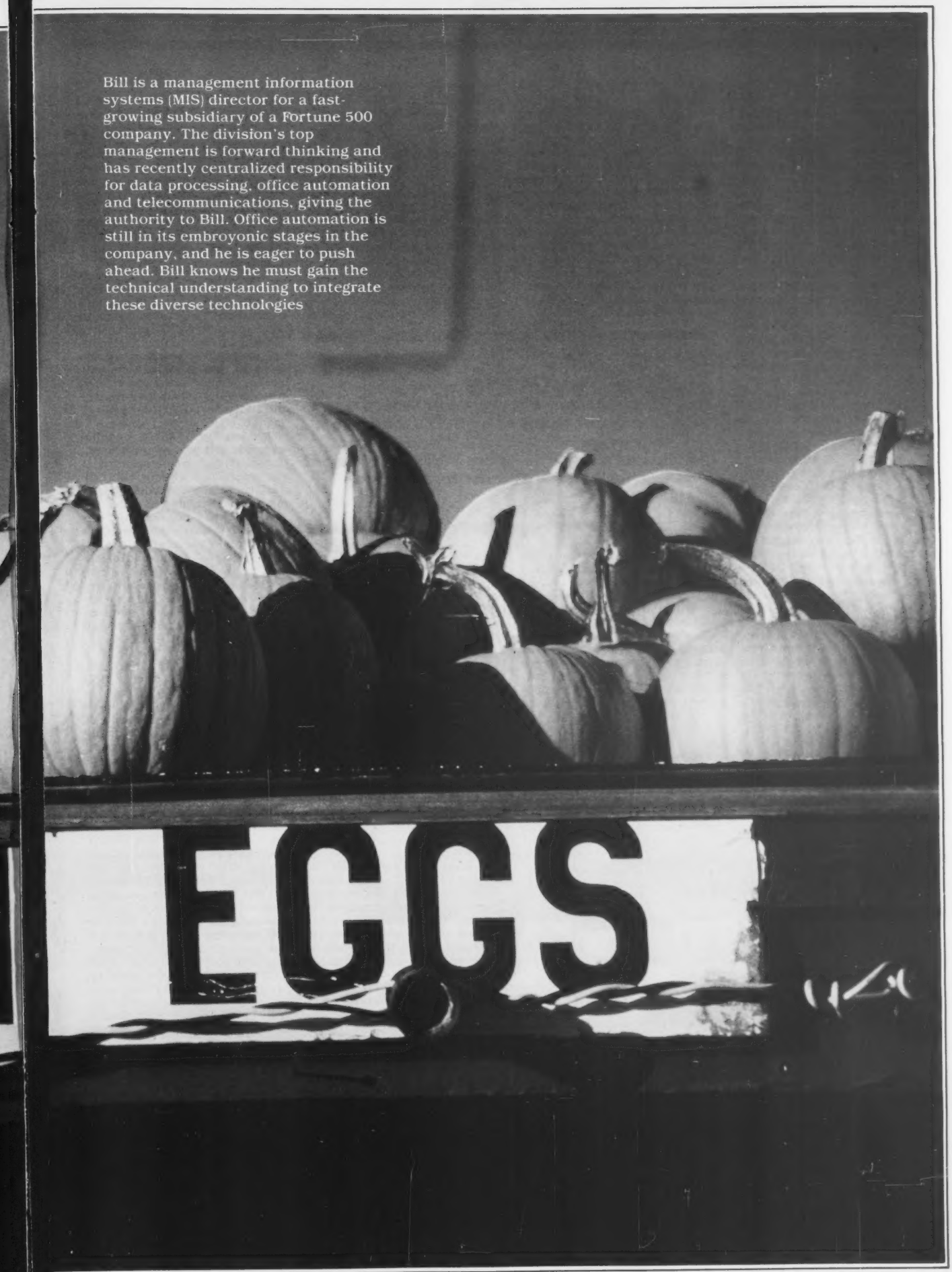
A Little Planning
Goes a Long Way

Needs Analysis

By Steven Abraham



Bill is a management information systems (MIS) director for a fast-growing subsidiary of a Fortune 500 company. The division's top management is forward thinking and has recently centralized responsibility for data processing, office automation and telecommunications, giving the authority to Bill. Office automation is still in its embroyonic stages in the company, and he is eager to push ahead. Bill knows he must gain the technical understanding to integrate these diverse technologies



effectively over the coming years. Since almost all of his background is in DP, Bill is eager to delve into office automation so his department can gain experience.

His eagerness also stems from his awareness that OA is a very hot item in top management's eyes. They have read the articles in their business publications that tout OA as the key to white-collar productivity. They have begun to realize that their managerial, professional and clerical employees may no longer have the proper tools to carry out their responsibilities effectively and efficiently. They recognize that within their organization a tremendous pent-up demand exists for adequate office support systems.

Like many large companies, Bill's firm has had a centralized word processing operation for several years, and numerous small-scale word processing systems are scattered about in various odd locations. The personal computer has also begun to proliferate. As a result, many people in Bill's company have been exposed to the benefits of office automation and want more. Bill's management has therefore asked him to ascertain what the company's "overall office automation needs" are and to get on with the implementation of "suitable" systems.

Bill figures he will probably need to spend hundreds of thousands of dollars over the next year in order to satisfy short-term needs. The investment in OA could easily reach millions of dollars within three to five years. He knows there are dozens of OA vendors with a variety of very different product offerings all claiming to satisfy his every need.

Bill has his hands full. He's got pressure from top management and from his users. He's got a complicated long-term technical problem to solve. His MIS department is relatively inexperienced in the OA area. He's got hundreds of systems from which to choose. He's going to have to spend a lot of money.

Certainly, Bill will approach this situation in the methodical way he does his large-scale DP development projects, employing a structured, top-down systems development methodology. He will begin with a healthy dose of strategic planning that will result in a clear statement of short-term and long-term direction for OA, DP and telecommunications.

To develop the plan, Bill will naturally form a top-notch study team to develop information and application requirements through a careful analysis of the business' functions and in-depth interviews with a broad cross-section of top management. This plan will, of course, be in support of business activities and objectives. It will address the manner by which applications will be developed utilizing integrated systems. The plan will establish priorities, assess resource requirements and lay out development time frames.

Armed with the plan, Bill will select a team to develop in-depth short-term and high-level long-term OA requirements. After assessing needs, Bill will then design appropriate architectures that will support those needs and have the flexibility to evolve to support future needs.

Only then will Bill be in a position to venture into the OA marketplace. Otherwise, he would not be able to make rational decisions about which vendors and systems are appropriate for his company. He would not know which applications are required for different staff levels and different functions. He would not have a handle on the number or placement of workstations over time. He would not be able to set implementation priorities. Right?

Wrong.

Bill feels he does not have time to approach the problem in this way. He has heard all the motherhood arguments about the importance of planning and needs analysis. When it comes to DP systems, Bill is the guy standing on that soapbox. But for OA systems development, he feels he simply cannot afford to devote resources to planning and analysis. He believes this even though he knows his company's current WP systems, implemented without the benefit of planning and needs analysis, are deficient in a number of respects.

So, what is Bill's approach? He has already decided what the solution will be. He will simply bring in his mainframe vendor's OA systems. Bill feels comfortable with his vendor and figures his choice will ensure that he will be able eventually to interface his OA and DP systems.

Bill is ignoring all his own advice and his years of experience in developing DP systems by not taking the time to develop a formal plan or determine requirements. If he is lucky, his mainframe vendor will have OA systems that satisfy his company's needs. And if Bill is really lucky, he will be able to evolve those systems to meet future needs.

Considering the investment Bill is planning to make, does this all sound very unrealistic? You would think so. But a number of large companies in situations very similar to Bill's — several among the Fortune 500 — have approached OA systems development in approximately this way, in the face of all the significant and obvious risks: systems that do not satisfy business needs, provide support in areas where high-payoff productivity gains are possible or provide a reasonable return on investment; systems that cannot evolve to satisfy future needs or are not accepted by users because they are too difficult to use; systems that can never be effectively integrated with DP systems or with each other; and vendors that provide poor service and training and so on.

Why is Bill willing to approach OA systems development in this ad hoc manner? Like many MIS executives, he is pragmatic and action-oriented. The pressure from his users and management is great. They want solutions soon. In this period of economic decline, management has created a sense of urgency to improve productivity through the development of office support systems.

It takes forever to get a capital expenditure request approved. Top management perceives that OA is somehow simpler than DP and, therefore, does not require such formal treatment (after all, it's just word processing). Although they have structured their organization to recognize the importance of integrated information systems, they don't necessarily see the implications at a technical level. And Bill also perceives the technical issues related to OA as being straightforward when compared with DP.

Why is Bill willing to approach OA systems development in this ad hoc manner? Like many MIS executives, he is pragmatic and action-oriented. The pressure from his users and management is great. They want solutions soon.

For all these reasons, Bill, like many executives responsible for OA, is hesitant to devote much in the way of time and resources to conducting the all-important development steps of planning and requirements definition. He perceives the cost of these activities, measured in terms of time and resources, to be too high relative to his perception of the need for carrying them out.

Bill's views come partially from an urge to get on with it and partially from a lack of background in OA. But whatever the source of these views, it is essential for any organization, whether a Fortune 500 company or a 10-man law firm, to devote some effort to planning and determination of needs before investing in OA. And although the process obviously does take some work, it does not necessarily have to be a long drawn-out affair in order to achieve useful results.

To some, planning conjures up visions of marathon working sessions, interminable studies and final reports that are out of date before they are issued. It does not have to be that way. Naturally, work and careful thought must go into a planning effort in order to attain meaningful results. But useful results can be achieved without conducting a textbook-style, comprehensive strategic information planning study.

The basic purpose of OA planning is simple: to determine the objectives and scope of short-term (one- to two-way) automation ef-

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forts and to take a stab at projecting long-term (three to five years) direction. With a modest amount of effort, a rough plan that maps out short-term and long-term scope and objectives can be developed. And by so doing, you will also be able to sensibly determine the objectives and minimize the scope of a needs assessment.

A reasonable way to get quick results is to form a planning committee and conduct two or three half-day brainstorming sessions. The first one or two sessions should produce an overall picture of short-term and long-term direction, with greater emphasis placed on short-term. The committee should include decision makers knowledgeable in office automation, data processing, telecommunications, the administrative support environment, key user departments and, perhaps, outside consultants to facilitate, lend expertise and objectivity. It is essential to have the various technical interests present (DP, WP, telecommunications and so on) so that due consideration is paid to current and past automation efforts as well as short-term and long-term MIS integration and migration strategies. Management representatives from the user side will provide important direction regarding application and information requirements.

This planning process should take into account business objectives, functions and goals. This is another area where the user representatives on the committee come in. If you do not wish to take the time to study and assess business objectives, functions and information requirements carefully, involve a few individuals with insight into these areas to spot the most important issues. It would be useful to review the rough-cut plan with other key managers in order to verify assumptions related to business needs. The committee should then review the plan one or two more times until it is satisfied with the high-level statement of objectives and scope for the OA development effort.

The following gives some highly simplified illustrations of what should result from this abbreviated planning process and how those results should clarify direction for the needs assessment.

For example, your company might be an OA neophyte. Introduction of word and records processing to support clerical staff might be the sole short-term objective. The scope might be limited to the finance and legal departments. Long-term needs might include expansion into other departments, the addition of professional support and development of an internal electronic mail network. In this case, a fairly constrained needs assessment would suffice, since both the objectives and scope of the OA effort will be constrained.

Bill's case represents another typical situation. His firm has some experience with OA. It has a WP center, a smattering of decentralized WP systems and a few personal computers. Management wants to stop the proliferation of incompatible systems and hopes to select a companywide vendor that can satisfy the basic office support needs of clerical, professional and line management staff. They want to provide decentralized systems for the entire company. In the long term, the company will probably introduce enhanced support for the professional and managerial staff and link their personal computers, WP systems and DP computers together.

In Bill's case, the objectives of the needs assessment would be somewhat narrow, since his initial objectives are fairly basic. However, the scope of the assessment would be broad because he wants to satisfy the needs of the entire company.

As a final example, a university might want to provide support for the document creation and research needs for its faculty and support staff. In this case, the main objectives of a needs assessment would be to determine WP needs for faculty (as opposed to administrative staff, for example). Here, the user population (scope) and objectives of a needs assessment would be constrained, especially if different academic departments had similar document processing needs.

Although these examples are overly simplistic, they demonstrate an important point. Articulating OA objectives and scope does not need to take weeks of effort. By first clearly understanding your objectives and scope, you can then rationally minimize the objectives, scope and level of effort necessary to conduct a meaningful needs assessment.

If you have no more time for the planning process at this stage, so be it. A little realistic, high-level planning is better than no planning at all. Realize, though, that you have not put in the requisite effort to develop an in-depth strategic plan and, therefore, you may not have accurately characterized applications and information requirements in terms of their rela-

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tionships to the business. However, you do have a reasonable road map to guide you in efficiently and effectively conducting the next step — the needs assessment.

At this point, you will be in a position to define the focus, objectives and scope for the needs assessment effort. You will have a good idea of which departments should be studied, what major functions and support needs will be addressed in the short term and what broad objectives have been defined for the long term.

A typical needs assessment could include any and all of the following basic steps:

1. Forming a needs assessment team.
2. Defining the needs assessment objectives and scope.
3. Selecting the organizational units that will be studied and the types of individuals that will be interviewed.
4. Conducting background research essential to the study team's understanding.
5. Conducting preinterview data gathering activities.
6. Developing interview guides.
7. Conducting interviews.
8. Synthesizing and summarizing results.
9. Preparing a needs assessment report.

Properly conducted, the needs assessment provides the information you need to develop a request for proposal or statement of requirements so you can meaningfully evaluate vendors and their systems. It is also potentially very time-consuming, and therefore often avoided. The key to minimizing the amount of time and effort expended on the needs assessment is to clarify its key objectives, forms and scope *before* you begin. Again, determination of these parameters should follow directly from the results of the high-level planning activity.

Step 1. Form your team. The team typically will include three to six individuals, depending on the number of interviews to be conducted. Team members should be of high caliber and possess excellent interpersonal and communications skills. If your team is not highly skilled, the entire needs assessment could be a waste of time — worse yet, it could yield erroneous conclusions.

The team's background should include a mix of technical expertise, systems analysis skills and knowledge of the business and organization. Often, consultants comprise a significant portion of the team in order to provide technical expertise, experience in conducting needs assessments, objectivity and independence. If you do use consultants, it is imperative to include members of your own organization as an integral part of the entire process. The experience and insight of your own people is invaluable. Direct involvement will also ensure that your people feel responsible for the outcome and that the knowledge and insights gained as a result of the needs assessment will be retained within your organization.

The experience and insight of your own people is invaluable. Direct involvement will also ensure that your people feel responsible for the outcome.

Step 2. Carefully define objectives and scope. Objectives and scope can be stated in terms of broad needs (for example, document processing support), the type of intended user (for example, clerical staff) and an intended user group (for example, the finance and legal departments). Some objectives might be less tangible, such as gaining political support for OA efforts. This particular objective could impact the selection of participants and artificially broaden the scope.

When objectives and scope have been clarified, look honestly at the amount of time and number of people that can be devoted to the needs assessment. Then you can sensibly determine where to concentrate your energies during the remaining steps.

Step 3. Select study participants. Here, perhaps, lies the greatest opportunity to minimize the time expended on the needs assessment.

First, select the smallest number of departments that are representative of those receiving the systems. Then select the smallest number of positions that need to be interviewed to provide a representative sample of the intended users. Realistically, some fact finding may be required to make good decisions at this juncture. (Step 5 can provide information to confirm or refute choices made at this stage before it is too late.)

In assessing needs, you may also want to include existing ser-

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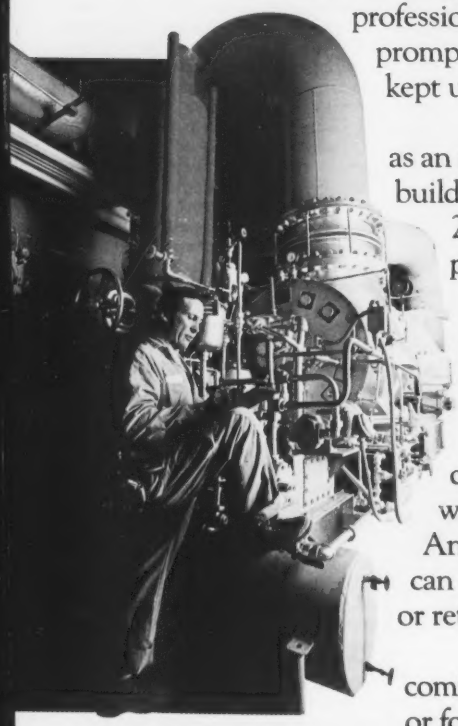

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vice departments, such as MIS, centralized WP and so on. They will provide your team with important information regarding the effectiveness of current information systems services, interfacing possibilities and so on. Restrict the investigation to only those service departments of direct relevance to the OA systems development effort.

Step 4. Do background research. Step 4 is necessary only to the extent that the study team does not possess knowledge or experience deemed essential to the study. For example, this step could include site visits to organizations that have developed OA systems to satisfy needs similar to your own. Or, you might have the need to update your team's knowledge on certain aspects of OA technology, such as integrated word processing/photocomposition systems or local networks.

Step 5. Gather information. This can be an excellent means of efficiently gathering valuable information that will improve the overall quality of the study. Here, for example, you might have a single person conduct an evaluation of your organization's experience with current OA systems.

Such information can be used to further refine the selection of departments and study participants made in Step 3 and will also provide valuable input to guide Steps 6 and 7.

Step 6. Develop interview guides. Obviously, the guides should focus on areas of interest to the study. Obvious or not, this simple bit of common sense is often overlooked, resulting in wasted time and useless information. If you only want to address document processing needs, the guide need not, for example, include broad questions regarding communications patterns. If there is time to address "blue-sky" issues in the needs assessment, inclusion of questions of secondary or potentially long-term interest definitely cannot hurt, but they are not an absolute necessity.

The point is, if you have limited time and resources, use the time intelligently and develop your interview guide with this in mind.

Step 7. Conduct interviews. The interviews themselves are the largest consumers of time, generally taking from one-third to one-half the total time devoted to needs assessment. Taking into account the time necessary for proper preparation, the interview itself and interview wrap-up, you must allow three to four hours for each interview.

There should be two to three team members at each interview: one to lead the discussion and one or two others, both to participate and to record the responses of the interviewee. If you conduct dozens of interviews, it is easy to see how the hours add up. This is why it is so important to be able to select a small number of representative groups to interview. If possible, conduct group interviews wherever appropriate.

Step 8. Synthesize and summarize results. The effort required in Step 8 is directly related to the number of interviews conducted. The fewer interviews, the less time will be required to synthesize and summarize results.

Step 9. Prepare findings. Finally, the findings resulting from the needs assessment and the conclusions of the study team are prepared. Time savings in this step can come from taking an informal approach to preparing the document, for example, writing in a bullet-style rather than with a lot of narrative prose.

This report should succinctly describe needs — for example, by using a matrix style for presentation. It should overview the effectiveness of current systems and describe alternative strategies and corresponding system configurations for satisfying short-term and long-term needs (with the emphasis on short-term needs). Issues such as training, system administration and organizational impacts should also be addressed.

Properly prepared, the needs assessment report provides all the information required to develop a request for proposal. The study team will also be in an excellent position to evaluate vendor responses and make rational systems acquisition decisions. And after the systems are implemented, there will be a lot of information on which to base ongoing system effectiveness reviews.

The message of this article is simple. Don't overlook the value of planning and of needs analysis because you feel they are not necessary or will take too much time. These two activities are essential to the development of OA systems that can appropriately satisfy needs and be integrated with other systems under the broad information systems umbrella.

A small amount of careful planning will allow you to streamline the needs assessment to fit within a reasonable time and resource budget. OA

Abraham is manager of office systems consulting at Price Waterhouse in Los Angeles.

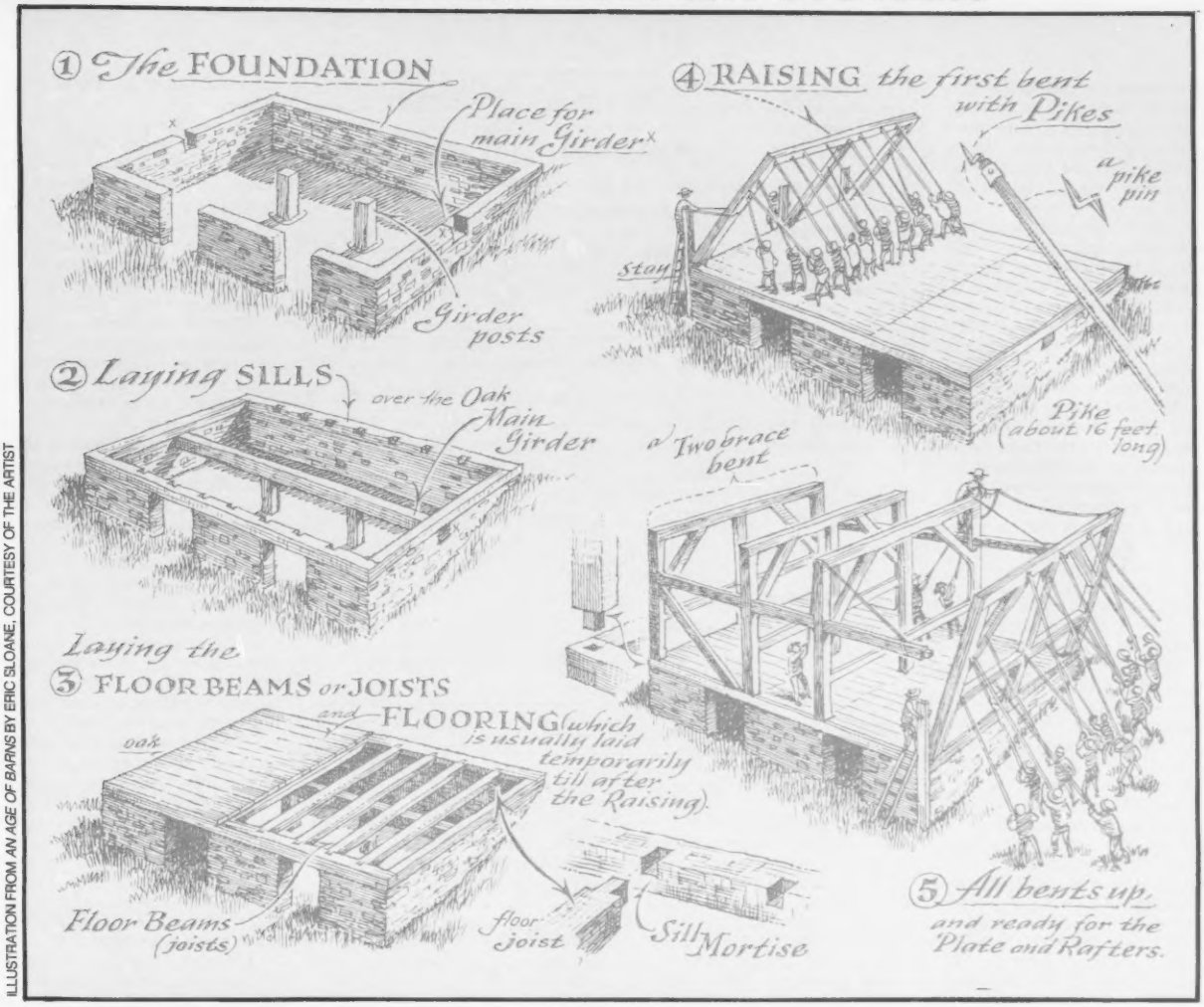

ILLUSTRATION FROM *AN AGE OF BARNS* BY ERIC SLOANE, COURTESY OF THE ARTIST

A Framework For Decisions

BY GARY GULDEN

Management support systems (MSS) constitute the fastest growing segment of the information system portfolio in most organizations today. "Management support systems" is the emerging umbrella term currently used to describe a broad class of applications that include decision support systems (DSS), executive information systems and delivery environments such as information centers and end-user computing. With the perspective of time, it is easy to identify the ingredients behind the explosive growth of MSS demand:

• The pace and competition in the business environment continue to increase. This timeworn claim was probably made 100 years ago by businessmen, but it is still true today. Even brand-new businesses hit the ground running on a scale few would have thought possible even 15 or 20 years ago. Moreover, competition must now be viewed from a perspective that is no longer regional or even national, but worldwide.

• Managers have become thoroughly frustrated with investing millions of dollars annually in efficiency-oriented transaction processing systems that have promised but seldom delivered comprehensive management information systems (MIS) as an eventual by-product. These large foundation systems continue to require a major share of available dollars just for their operation and maintenance. The systems were built to improve clerical efficiency, and most managers are concluding that further investments in their enhancement will never produce systems that will have a direct impact on the effectiveness of managerial activities.

• Managers are observing that MSS technology (in the form of personal computers, end-user languages, analysis and modeling tools and so on) are available at reasonable costs . . . and they work.

• An ever-increasing share of the managerial population recognizes what the technology can do for them, and many younger managers are bringing to the job hands-on experience with MSS tools acquired during their education.

The MSS that are being created today through the application of the new MSS technologies are very different from traditional MIS systems or the operations research model-based systems that passed for DSS in prior years. One now sees interactive systems engineered to support a manager's logical analysis and decision-making processes.

Many such systems have been built in the airspace above the foundation transaction-based information systems in large corporations. Perhaps the most common varieties of this kind of MSS application are market analysis data systems constructed, in part, on top of order entry systems. These allow marketing and sales management to understand consumer behavior on a highly segmented basis, to judge the performance of existing products and marketing strategies and to detect opportunities to introduce new or reposition existing product lines.

The key ingredient in MSS is the degree of close personal involvement between the system and its ultimate user. A guiding principle of MSS is that "the user shapes the tool while the tool shapes the user." This does not mean all managers making use of MSS are doing so in the hands-on fashion. A good many successful support systems are "chauffeur driven," but all have been developed and have evolved under the close personal direction of the individuals who stand to gain most from the systems.

What is available in the marketplace today? The MSS software tools offered are reflections of the three fundamental uses to which people put management support systems:

• Simple inquiry into data bases for purposes of monitoring and control.

• Manipulation of data in order to perform analysis and gain understanding of what the data is telling you. This ranges from very simple ratio or rate-of-change calculations to highly complex statistical analyses such as regression and linear programming.

• Simulation or modeling, aimed at answering what-if questions.

Jack Rockart and Michael Treacy of the MIT Center for Information Systems Research have represented these MSS uses as shown in Figure 1, which also shows the software capabilities that correspond to each use. This same framework can be adapted to provide a helpful way of understanding the capabilities of the various MSS software tools available on the market. Graphics output is shown in Figure 1 as a communications capability that is valuable across the full spectrum of MSS uses and just a few of the many popular MSS software tools are also portrayed. Most products shown were originally developed with one particular functional emphasis or strength. A few, such as Express and Strategem, are completely integrated four-function products; most other products have already begun to migrate into functional areas outside their initial strength. The trend is clearly toward four-function capability. (Note also that practically all these products offer some form of graphics output.)

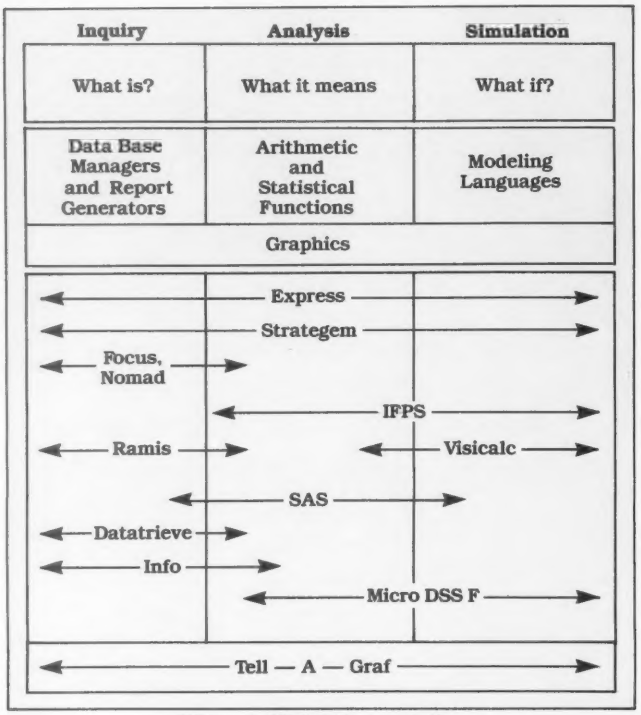

Figure 1. MSS Software Tools

The differences in capability from product to product are fairly great, however, and one should not assume products are comparable because the sales literature uses common terms such as data base, statistics, what-if, spreadsheet analysis, graphics or user-friendly. Selection of MSS software technology requires care, because serious consequences can result from providing an inadequate kit of tools in an environment of explosive demand.

The explosive growth occurring in MSS is running head on into the explosive office market. In fact, the fields of MSS and office technology are on convergent paths, but few recognize or are doing anything about it. Two forces are bringing these fields together: the evolution of MSS technology and the intrinsic capability of office technology to support communication between individuals and between groups of individuals.

Let's examine the evolution occurring in the delivery environments for MSS. The advent of high-powered microprocessor technology has caused the delivery environment for MSS to migrate away from the simple terminal hooked to a mainframe. The new direction is toward a networked environment consisting of mainframes, which serve both as stores of mass data and high-speed computing resources, and personal computers, which function alternatively as terminals to the mainframe, stand-alone personal computers and senders and receivers in a communications network.

It is evident that the more highly evolved MSS delivery environments will have many hardware, network and communications characteristics that make them harder and harder to tell apart from an OA environment.

The text and message-handling capabilities of OA technology respond to a fairly serious limitation in MSS typically in existence or under development today. Problem identification, analysis and decision making do not really take up a great proportion of a manager's activities. Communicating with superiors, peers and subordinates takes up a far greater amount of time. A manager who uses an MSS to help identify a problem or to arrive at a decision can very likely benefit from system capabilities that then allow him to communicate those findings and desired action steps to others in his organization. The importance of fulfilling this outward communications need becomes clearer when one considers the following:

• Most managers do their thinking, problem analysis and decision making after hours, often at home.

• Many managers travel extensively and find it difficult to communicate with their co-workers either by phone or face to face. It is clear managers require both support analysis and decision making as well as support for the actual execution of the actions prompted by their analysis and decision making.

To bring MSS and OA together, a significant amount of effort will be required by information systems managers. Among the tasks that need to be done are the following:

• ***Broaden the view of OA activity.*** Only recently has the world of traditional information systems begun to strike a more appropriate balance between efficiency-oriented applications (motivated by clerical cost-savings) and effectiveness-oriented applications (geared to helping managers do their jobs better).

Similarly, in most organizations today, office technology applications have not progressed beyond the stage of word processing aimed at saving clerical costs.

• ***Plan jointly for MSS and OA.*** Organizations committed to applying information technology to improve management effectiveness must begin to perform applications planning and technological planning with an eye toward bringing together traditional DP, MSS and OA.

Clearly, that's easier said than done, particularly in light of the numerous technical incompatibilities between most presently installed OA and DP systems. However, most leading OA vendors have new products, either already on the market or close to introduction, that will permit the merging of OA and DP systems and will allow managerial and professional end users to employ their office systems hardware as the delivery medium for MSS.

• ***Guard against the "supply-push" approach.*** Perhaps the greatest obstacle to overcome is the temptation to provide MSS via office technology in the form of solutions looking for problems. Before making any significant investment in MSS, you must be sure you are working on the right problems. Effective techniques (notably, the critical-success-factors interviewing approach) exist to detect and develop latent demand for high-level MSS applications. Small-scale prototype activities that will serve as success models represent a further technique for stimulating thoughtful demand for MSS.

A technology-first approach in this area is a sure way to spend a lot of money in a hurry, show little value in return and jeopardize your chances of ever having a second opportunity to do it right. **OA**

Gulden is a vice-president at Index Systems, Inc., a Cambridge, Mass.-based research firm specializing in information systems.

WHEN & WHERE?

Local-Area Nets

BY BRIAN R. BLACKMARR

The local-area network is becoming an important part of strategic plans for office automation for many organizations. Too often, however, planners tend to focus on technical design aspects and neglect the vital issue of how these networks will be used. Certainly, technical considerations are important and local-area networks will continue to develop rapidly.

In the highly service-oriented OA environment, however, a careful understanding of what applications are suited to local-area networks will be essential to success. And, because some local-area network designs are better suited to some applications, a clear idea of the anticipated applications may also drive decisions about the appropriate design. The criterion applied to planning the implementation of a


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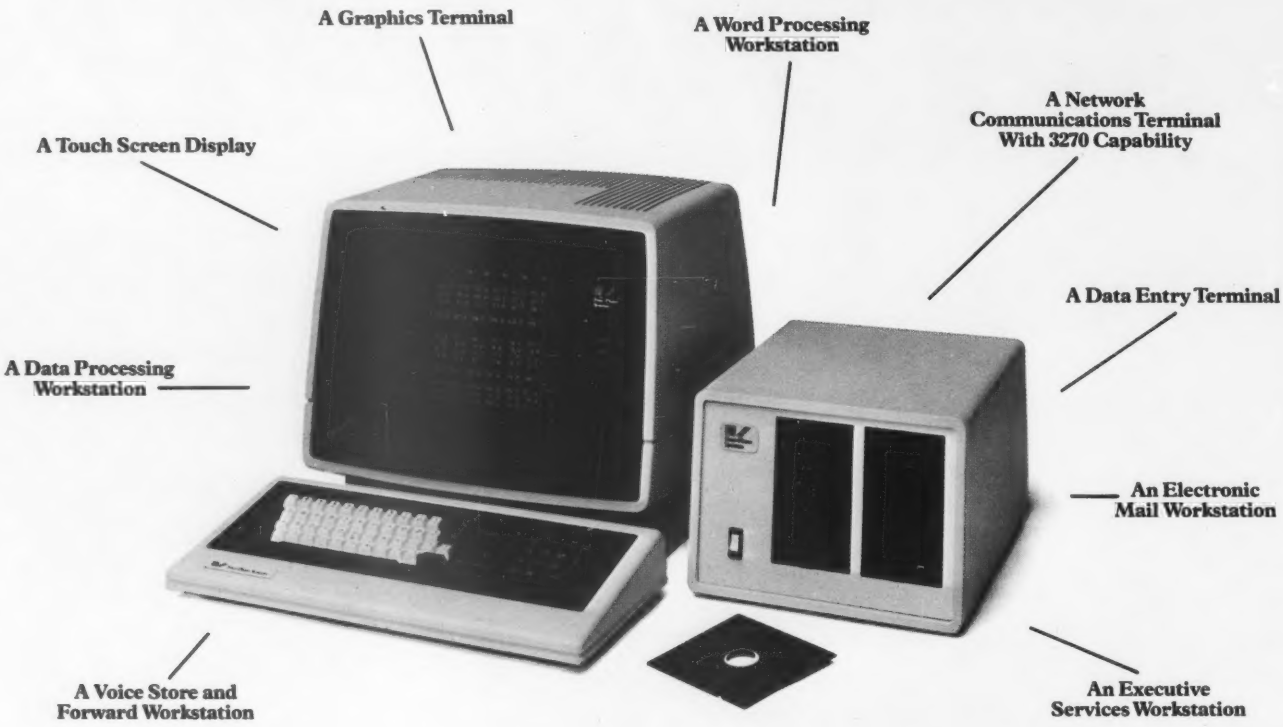

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Local-Area Net Technology

Local-area network physical design approaches, or topology, can affect usage, and it is worthwhile to review them very briefly:

• **Star:** A star configuration is a traditional approach to interconnecting devices where each is linked by a separate line to an overall connection point or controller. This configuration is typified by many existing data terminal systems and most private branch exchange installations, in which all transmitted data typically must pass through a central control point to be transferred from one device to another.

• **Data bus:** The data bus approach physically interconnects devices by means of one or more cables that run between the devices, but do not pass through a centralized controller mechanism. In this situation, data may pass directly from one device to another or may be routed through a control point, but not in a centralized location.

• **Ring:** The ring approach interconnects devices in a manner similar to that of a data bus, but it connects the cable in a ring or circular pattern. In this approach, data is often transmitted around the ring in one direction between the interconnected devices.

The physical design of a local-area network is not the only factor that influences usage. Logical control of data handling procedures and the data throughput capacities are also important, because they can directly affect local-area network applications.

The primary logical and capacity design concerns and some applications implications follow:

☐ ***Token passing vs. carrier sense multiple access/collision detection (CSMA/CD):*** In local-area network logical control alternatives, where a network controller is not used and where devices are allowed to transmit information whenever ready, data collisions can occur when more than one device attempts to transmit simultaneously. Preventing data collisions is a major concern. With CSMA/CD, the individual devices check for a busy line before sending data; check to detect collisions; and, if collisions have occurred, retransmit after a randomly determined interval.

With token passing, collisions are prevented because each device has the right to transmit only while it holds a logical "token" that is passed from one device to another in a prespecified manner. Token passing does, however, require a provision to restart the communications process (that is, to establish a new token) if a device fails while holding the token.

In choosing a data collision approach for a particular set of applications, users should remember most local-area networks utilize packet switching. Data is sent as a series of small "chunks" rather than in a continuous string. Although both token passing and CSMA/CD can handle the potential collision problem effectively, CSMA/CD is generally best suited to fairly short message transmission where one user need not "seize" the system for major data transmission over relatively extended periods of time.

Token passing may be better suited for environments with longer transmission lengths or larger packets.

☐ ***Baseband vs. broadband:*** This is probably the most hotly contested issue of local-area network design and is an issue that should be very closely tied to application planning.

Broadband local-area networks use one of several approaches — frequency division multiplexing is a common choice — to divide the throughput capacity of the local-area network among several concurrent uses. Because of this capability, a broadband local-area network is more sophisticated than baseband and, therefore, currently more expensive. Broadband can provide a tremendous data throughput; as a result, it is well suited to high-volume communications of all types.

A baseband local-area network is more limited; it typically assigns its entire capacity to a single user for a very brief period of time. At any given moment, only one device can be transmitting on a baseband local-area network. Although the baseband approach does not provide the capacity of the broadband local-area network, it is less complex and still provides considerable data handling capacity (about 10M bit/sec), frequently at a far lower overall cost. The baseband local-area network may, therefore, be well suited to the primary requirements of many low-volume users (which many OA users are at present), but not be suited to very high-volume needs (for example, large host CPU to large host CPU).

☐ ***Data cable vs. phone-based local-area network:*** Beyond the issue of local-area network topology, the physical configuration of the system may be based on at least two major choices of circuitry. Many local-area network systems utilize a data cable, or Catv cable, run between the interconnected devices specifically for this purpose. However, an alternative does exist; existing phone lines — for example, twisted pairs — can be utilized for local-area network circuits. A phone-line-based approach may be very attractive for offices such as government agencies located in older buildings, where it can be quite difficult and expensive to string new cable among the numerous locations served by the network.

From an applications standpoint, the choice of whether to use a phone-line-based local-area network is almost a direct extension of the baseband/broadband discussion. The best throughput typically achieved on a twisted pair under very good conditions is about 56K bit/sec. This fairly limited throughput of most phone lines means that, again, the required throughput of the local-area network becomes the key issue. Most phone-based configurations are a star pattern with a centralized local-area network controller, which means that each line must carry only the data traffic for the user connected to that line and not for the entire system.

The real issue is how high the data handling volume will be on a particular line. It is also possible to assign multiple parallel phone lines (where they exist) to get a greater throughput, but even so, a phone-circuitry-based system should not be expected to handle real-time video or major CPU-to-CPU high-speed data transfers.

local-area network, as in other areas of OA and information services, should be that of finding the most cost-effective approach to meeting defined business needs. Planners should not attempt to utilize technology for its own sake or apply a philosophy of making the users a test-bed for the latest product announcements.

For purposes of this discussion, a local-area network is defined as an electronic communications linkage that in no way requires the use of public communications facilities — either phone or other PTT services, dedicated long-distance data lines or satellite communications. Within this definition, a wide variety of alternative approaches exist for physical and logical linkages (see "Local-Area Net Technology" above for a discussion of some of the major design alternatives).

The following trends emerge if we look at how local-area networks are most likely to be used and how well various design approaches generally meet these needs:

• Total information networks. With the accelerating integration of all types of digitized information, many organizations may view local-area networks as their basic building blocks or foundations in achieving overall interlinkage. The network may therefore not be limited to connecting a variety of devices, but rather may act as the backbone of all forms of communications linking all devices, large and small. In this context, a local-area network would also be used to link character-based data handling devices (data terminals, CPUs, word processors and so on) and to handle noncharacter communications (voice, graphics and so on). The network here would probably have to carry all voice traffic, as well as any required video communications (security monitors, videoconferencing and so on).

Where this total communications applications approach is employed, the throughput capacity and linkage interface flexibility of the local-area network are of paramount importance. With this applications strategy, a broadband network with considerable throughput and a wide variety of interconnection possibilities will clearly be the best choice. In this situation, the local-area network must be able to handle the tremendous bit-transmission loads required by video, sophisticated graphics and major voice transmission (see Figure 1 on Page 44).

When the local-area network is intended to be a total communications network, it usually will be based on a broadband data bus or ring using high throughput circuitry (possibly multiple coaxial cable or fiber optics).

Although a baseband system initially would be possible for lower traffic volume uses, it could mean unacceptable performance as the users needed to expand into non-character-based uses such as major voice traffic applications, real-time video or heavy graphics. Some studies have found that having above a load factor of about 20% of a baseband local-area network maximum capacity, the service quality for applications such as real-time voice can become objectionable to the users. It should not be overlooked, however, that a total communications local-area network could be made up of several baseband local-area networks interconnected by a single broadband local-area network. Although this approach is more complex than that of a single homogeneous local-area network, it does allow the use of cheap (baseband) linkages to low-volume users, while at the same time providing high-volume (broadband) capacity where needed.

• Process control linkages. Local-area networks have found practical application in some manufacturing organizations as

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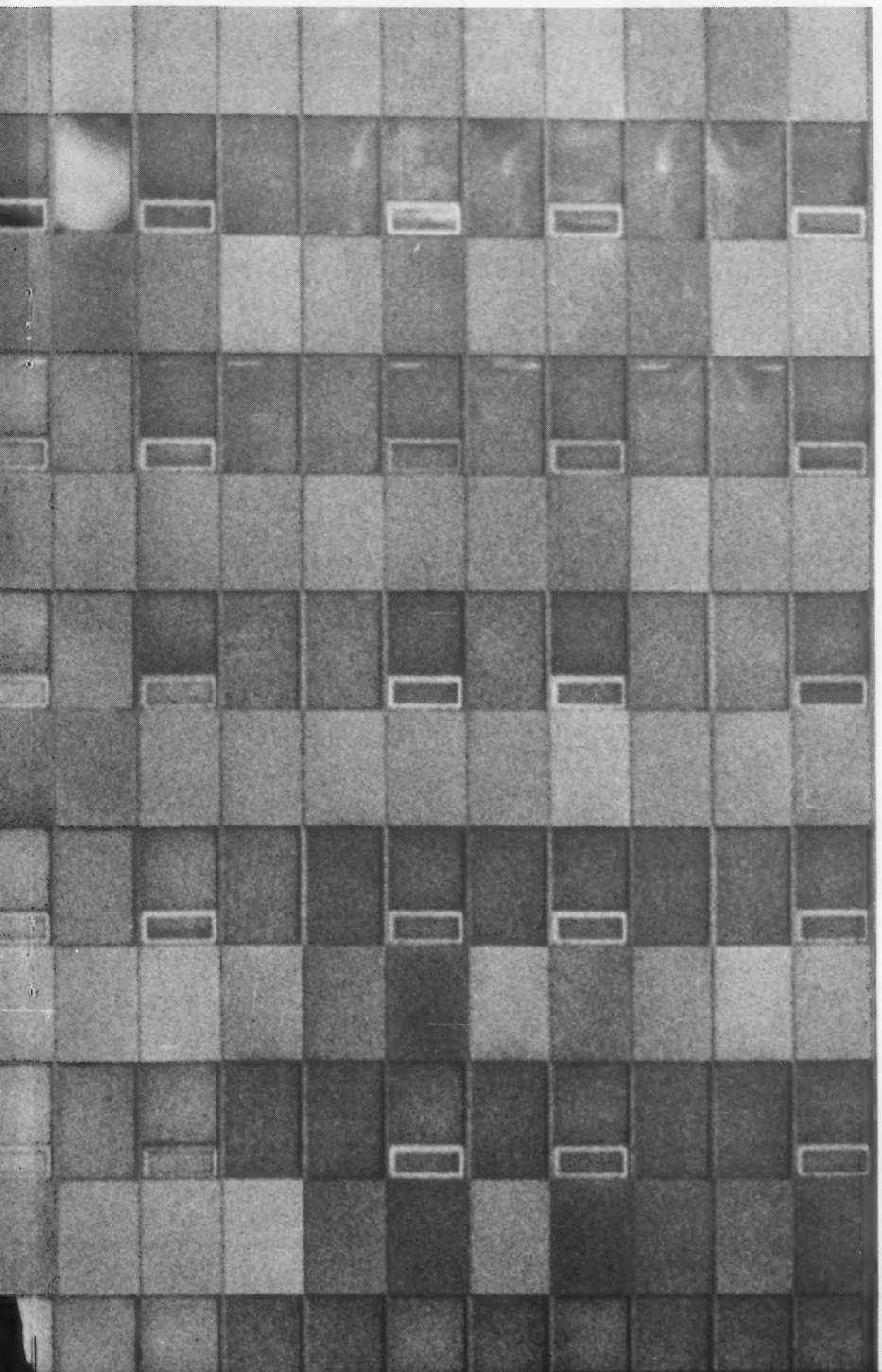

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Application Type	Preferred Throughput Rate* (Bit/Sec)
• Telex	55
• Low-Volume Data Communications	4,800
• Moderate-Volume Data Communications	9,600
• High-Volume Data Communications	56,000
• Digital Voice	32,000
• Analog Voice	64,000
• Digital Video	3,000,000
• Television-Grade Color Video	92,000,000

*Using current transmission techniques typical for each type of communications.

Figure 1. Typical Data Throughput Requirements

the basis for manufacturing process control and shop floor information systems. Although these applications can vary greatly in size and complexity, in general they are suitable for data bus approaches that allow interconnected devices to be relocated with a minimum of effort. In large process control installations, broadband throughput may be required, but in smaller environments baseband will suffice. These local-area network usages may include the actual control of automated manufacturing equipment and the collection of production data for manufacturing support systems. These networks can also be used to do frequent checks of process monitoring devices in continuous manufacturing environments (such as chemical production systems).

• Distributed "mainframe" processing. Another rapidly developing application links many small microprocessors into a network that collectively can emulate the data handling functions of a large processor. Each micro is somewhat analogous to a partition of a larger mainframe and is assigned to handle a portion of a large processing task or assigned only the portion that relates specifically to its user (calculate daily sales credit, save that locally and also forward it for overall summarization).

The local-area network operating software necessary for this type of application continues to be refined. However, it seems likely that this kind of network application may become popular for organizations with a large number of interconnected desktop processors. These small machines may be used during off-shift periods to handle some major applications and reduce mainframe costs or peak loading.

• Strictly office-system linkages. In many large office environments, a very real need exists for a local-area network just to link separate office devices and, possibly, to provide some limited access to the host. The office machines thus linked by the network usually include word processors, microprocessors or desktop terminals and, especially in Europe, FAX machines. These local-area networks may include some limited voice applications (often based on specialized terminals), but are not likely to replace current phone systems or existing data lines.

Because of their fairly low-volume usage, these networks can be based on baseband technology or specialized private branch exchange (PBX) approaches. In environments with many low-volume users, the cost of connection will be quite important.

A look at general office applications where local-area networks are actually beginning to be used reveals several functions that are frequently of value in large offices:

• Electronic mail/message. By means of a low-cost local-area network connection, even electronic typewriters can be linked into an overall electronic mail system. Experience indicates such traffic is typically short and memo-like (usually in the range of 400 to 500 characters per message) and ideal for handling under most carrier sense multiple access/collision detection local-area network systems.

• Voice annotation of files. Current multifunction office workstation terminals offer the handling of digitized voice messages. These messages are usually appended to regular character-based files and can be retrieved as footnotes or instructions by anyone viewing the base file on a CRT. Because voice notations are intended to be brief (only a few seconds), they may be handled along with their associated data files on the local-area network, even one with a fairly low throughput.

• Voice messaging. Many large corporations are presently initiating voice messaging systems as an alternative to character-based electronic mail. With this capability, users can capture and transmit voice messages rather than utilize keyed electronic mail memos. While users cannot have a hard copy of this type of communication, it nevertheless is very easy to use and quite popular. Because of the brief nature of this type of voice traffic, a baseband local-area network might be able to handle it, especially if the digitized voice files are small notes. Voice message applications are obviously suited to local-area networks based on PBXs and those utilizing phone-line linkage through digital switching and specialized storage.

• Videoconferencing. Although the current high cost of videoconferencing is causing some concern, many multilocation organizations are hoping to use these techniques to reduce the disruption and costs of extensive travel. Real-time video requires a tremendous data throughput, but tests have indicated that freeze-frame video (a picture every 15 seconds or so) overlaid with real-time voice is adequate for most conference meeting applications. Because this freeze-frame approach requires greatly reduced data transmission loads it is suitable for many types of local-area networks, including those based on phone system circuits.

• Graphics. Bit-mapped office workstations are becoming more common today, especially for use by technical professionals. These devices are also likely to be linked by local-area networks for image transmission and to utilize the storage capabilities of large disk drives and so on. In this manner, each such device will not locally require the fairly substantial storage associated with bit-mapped display and graphics usage. Because the use of limited graphics has been particularly well accepted by the users of desktop microprocessors, this application becomes an important local-area network capability when the micros are linked together.

• Specialized OA task applications. Beyond the overall functional applications of office-based local-area networks, many specialized user applications are likely to be addressed. Obviously, user applications will vary considerably, but a few office applications well suited for use on local-area networks include personnel information (the personnel records function of large organizations), distributed low-volume data entry, financial and budget data distribution, procurement/purchasing processing and project tracking and scheduling.

The key to determining the best network is to identify what type of service users require.

All of these are common office applications, and each is suitable for local-area network usage because a need exists to transmit or share information among several locations. Although these applications may have been addressed by mainframe approaches, to date they frequently have not had the effective linkage to the end users that can be provided by local-area network facilities.

In summary, a wide variety of possible local-area network alternatives and a broad range of likely applications exist. The key to determining the best approach in any situation is to carefully identify exactly what type of service the users will require and what the business need will support. The selection and design of a local-area network may hinge on such issues as whether users, for good business reasons, will require the use of video and thus are willing to support the associated higher cost of a network that provides these capabilities.

Cost considerations should weigh heavily in the determination of a local-area network strategy and, applied to office-based tasks such as electronic mail, the connect cost may well determine the success of the application.

Remember, the proper perspective for planning the appropriate local-area network for your use is to attempt to provide the lowest cost solution to meet your defined business needs. OA

Blackmarr is a partner with Lifson, Herrmann, Blackmarr & Harris, management consultants based in Dallas and Washington, D.C.

The Big Cheese

CAREER DEVELOPMENT

It may have been the slick, clean imagery of the television and magazine ads. Or maybe it was the study that projected potential corporate savings of $125 billion annually in the U.S. alone. Whatever the reason, office automation has captured the fancy of everyone from secretaries to chief executive officers.

For some, though, OA is more than fancy — it's opportunity. Management information systems (MIS) managers eye that new hardware and dream of an expanded power base. Communications managers see a chance to adapt their existing networks into a total office network. Word processing managers see an opportunity to use their office knowledge at a corporate level. All these

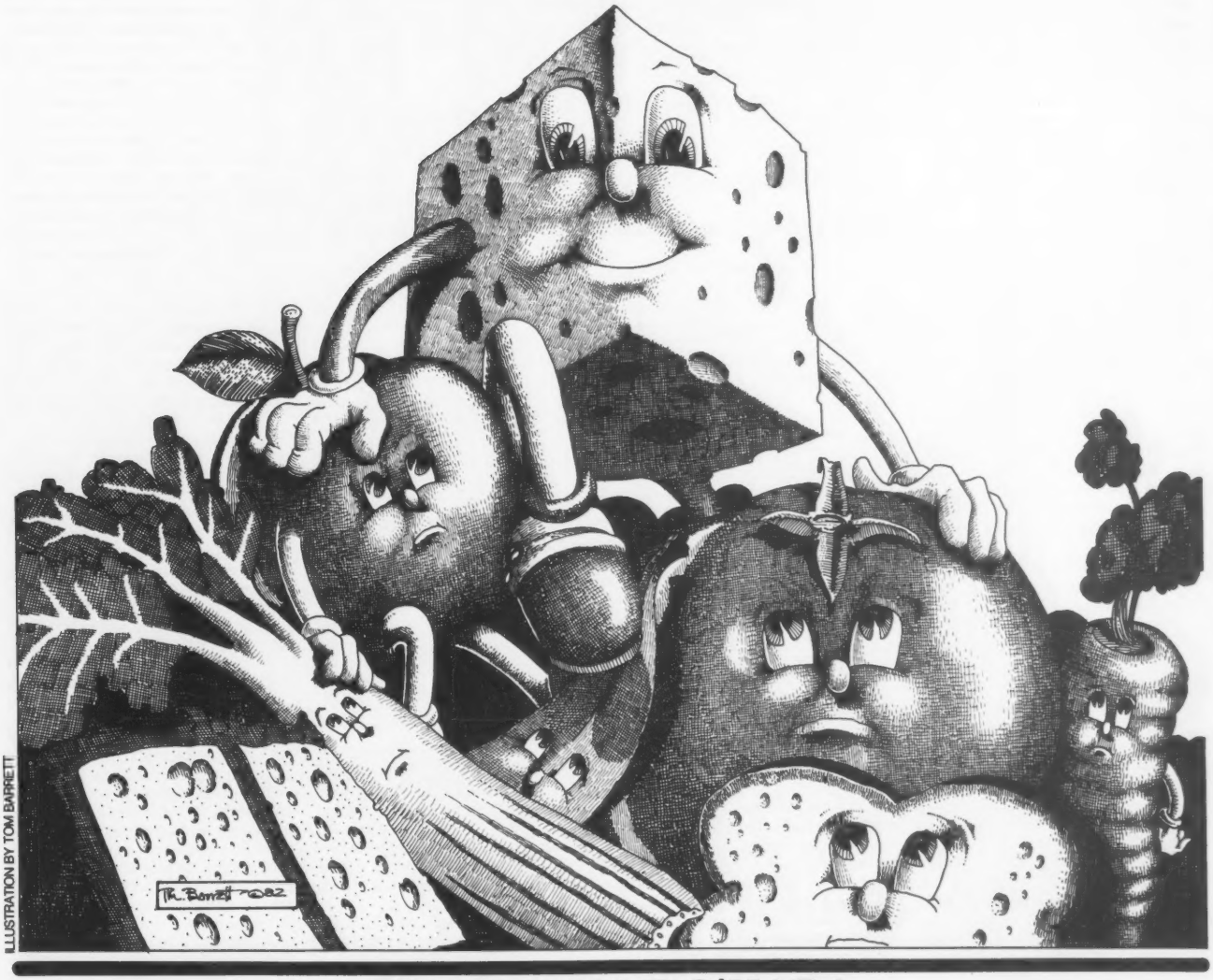


ILLUSTRATION BY TOM BARRETT

BY ROCHELLE O'HARA

people are very watchful right now — both of the future and of each other.

Why are they watching each other so closely? Because OA seems headed toward centralized control within the organization. Already we see a mandate of sorts for integration and assimilation of the various information functions. This integrated information services department will be a powerful corporate force. And, if current projections hold true, by the end of the 1980s the automated office market will be larger than today's DP market — that means big budgets and big responsibility.

In short, there's a race under way. Someone soon will be managing an extensive and intricate OA network of personnel and technology. Who will this information manager be? Consider three possibilities:

• "The central focus of management [of the automated office] will remain in the DP shop. . . . MIS, because of its experience and expertise, will have the legitimate right to this role" [CW, Sept. 6].

• "Communications managers are finding that instead of working solely to control costs, they are being asked to provide a service [constructing a telecommunications network] that will help the corporation meet its strategic objectives" [*Business Week*, Aug. 30].

• "A pressing need in information management is better overall management coordination and improved strategic planning. In planning activities, an experienced WP manager having sound knowledge of typical user support needs can play a key role" [*Words*, June-July, 1981].

Three very different viewpoints. Although it would be an overstatement to say the parties involved are squaring off for battle, certainly all are positioning themselves carefully. The next few years will determine the OA management structure within their organizations. What qualifies each of these managers to assume the role of information manager?

MIS managers seem to have the edge right now in this race. Because they have the technical experience and the hardware knowledge, MIS departments most likely will make the initial selections of OA equipment. And, if executive management gives MIS the responsibility for designing the OA system, the MIS manager will have implicit control over the end users' choices in the automated office.

The corporate visibility of MIS is a big factor, too. In most organizations, MIS is a corporatewide function. An MIS manager controls a multimillion-dollar budget — you can be sure executive management knows how those millions are being spent. When MIS is about to purchase a new computer system, the decision is made with an eye toward how that system will help the corporation achieve its strategic goals. The relationship between executive management and MIS has not always been a happy one. Faced with the complexities of designing and implementing an OA system, however, management will probably go for a familiar face.

However, communications managers have emerged recently as strong candidates for information manager, largely because of some exciting developments in telecommunications.

Communications managers are no longer purchasing agents who buy services from AT&T. A recent *Business Week* article reported that one large corporation has constructed a communications network that can handle not only telephone calls, but also electronic mail and videoconferences. With a budget of $26 million for the network, the communications manager there assumed a position of great corporate prominence almost overnight.

If expanded communications capability is a trend — and it appears to be — it would be natural for executive management to give communications managers the functional responsibility for the more sweeping technologies of the automated office.

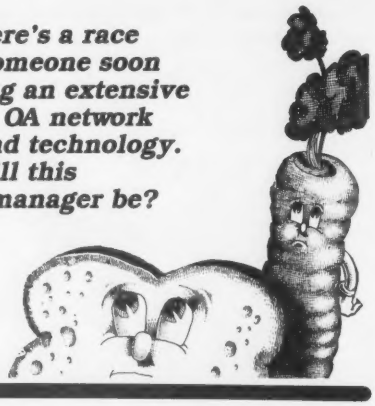
Nevertheless, several factors indicate that the position of information manager is in some cases an attainable goal for WP managers. WP managers already have experience with a small communications network, if their WP centers use communications devices with their terminals. In this case, a WP terminal is the prototype of the multifunction terminal of the automated office. In addition, the WP function is geared toward timely user support — a prerequisite for the automated office. WP managers have more experience in responding to management's need for information now — not weeks or months later, after a systems analyst has examined the problem, put the programmers to work and produced the system.

Most important, managers who oversee either a centralized WP function or a number of office functions understand better than anyone in the organization how the information flows within an office.

All these managers — MIS, communications and WP — face some obstacles on the road to information manager.

MIS still suffers from an image problem. The image is not so bad now as it was 10 years ago, but some still feel MIS departments are not attuned to management needs — that they're too hardware-oriented and not responsive enough. Another obstacle, which results from MIS' traditional isolation within the organization, is that MIS managers have not had exposure to the office's total flow of information. This knowledge is crucial to managing the automated office. If the OA architect does not know how people interact and how the office works, the best hardware in the world won't save the system.

In short, there's a race under way. Someone soon will be managing an extensive and intricate OA network of personnel and technology. Who will this information manager be?



A third obstacle for MIS managers is in the very nature of office automation. OA will change the way people interact, the way data is communicated and the way decisions are made within an organization. Personal computers and local-area networks have already given users more control over their information processing. Even if MIS gains central control over the automated office, they will probably have to give up some of their traditional powers. No longer will they enjoy that heady feeling of being the only computer people in the place.

Communications managers, on the other hand, have avoided some of MIS' problems. A communications network is designed to be responsive to users, to follow the flow of information in the office and to give users more individual control.

Unfortunately, communications managers lack the systems experience and — generally — the proper technical training, both formal and informal. A second challenge communications managers face is reducing their dependence on public utilities. At many large corporations, communications managers will soon be running what amounts to a private telephone company. To meet this challenge, they must expand their technical and functional skills, as well as their ability to sort out and purchase the right hardware from the right vendors.

The WP manager faces similar obstacles, the most obvious being a lack of formal business education and training in systems and information management. But another, more insidious problem exists: the corporate attitude toward what have traditionally been office support functions. This attitude can be seen clearly in the differences in salary and reporting structure between WP and MIS departments. A great deal of consciousness raising is necessary before WP personnel could be perceived as serious candidates for information manager.

Another important indicator of corporate attitudes is the reporting structure for WP managers. Recent statistics have shown that more than 91% of MIS managers report to such positions as president, vice-president, finance officer and director of MIS; in comparison, fewer than 37% of WP managers report at this level.

It is clear from these statistics that WP is not a corporatewide function, but is usually only support for specific departments. Because there is often no coordination between departments needing WP support, equipment frequently is not compatible and WP control is fragmented.

The race for information manager is far from over. The smart money is on the MIS, communications or WP manager with the right blend of skills and experience. Getting that blend won't be a simple matter, but here are a few suggestions:

• Training. Because OA is an emerging area, a formal training curriculum tied to career advancement does not exist. The individual must develop the training plan. For MIS managers, obviously, the problem is not so acute; they already have a high level of technical training, both formal and informal. But even the MIS manager will need some supplemental training — for example, in WP hardware and software — to meet the needs of the automated office.

For the communications and WP managers, a self-development program should include technical studies related to software and communications and functional studies focusing on general business knowledge. A wide variety of sources are available for both the technical and functional knowledge. Vendors offer training, schools offer evening business courses and professional associations frequently sponsor seminars on a variety of subjects. At a minimum, the individual should read trade publications for relevant articles and announcements of con-

ferences, programs and seminars.

• Visibility. For communications managers and WP managers, more corporate visibility is essential. One way these managers can start is to make others aware of their departments and their unique expertise. This can be done in a variety of ways, depending on what is appropriate for the organization. Informal sessions can be announced on a bulletin board and held during lunch hour. Or, if the organization holds regular meetings, communications and WP managers should get on the speakers' agenda.

Visibility also can be gained by working more closely with the other information groups — especially with MIS. In this way, communications and WP management can become better known to MIS and can establish a relationship of equality that might not have existed before. They may also be in a position to take part in decision making.

For MIS, gaining more visibility takes on a different character, since they already have the corporate exposure. MIS managers need to increase their user visibility. They need to come out from behind their glass walls and cultivate relationships with the users who will be a part of the system. By being responsive and interested in the user departments, MIS managers can gain that crucial exposure to the office's information flow.

• Formal Education. Here, as with training, MIS managers presumably have the edge. To compete with MIS, then, communications and WP managers must consider getting a management degree. More traditional business managers are now being sought even for an organization's technical departments. One executive is quoted in a recent *Business Week* article as saying that companies need "a different breed of people who have a business sense and can relate technology to the bottom line." The new breed of information manager could well include those who combine office systems experience or communications expertise with a strong, broad business background.

• Changing companies. The personal campaign for increased visibility and responsibility may not always succeed within a single organization. The answer for some managers may be to seek further education and then build a career in another organization. This form of advancement has been effective for MIS personnel, particularly in the early days, when demand for competent personnel far exceeded supply.

Office automation has put WP and communications managers in a comparable position today — the potential that OA offers makes it attractive for almost any size and type of business. By marketing their expertise in the right way, communications and WP managers can capitalize on this potential.

No matter who wins the race for information manager, no one will win unless organizations gain commitment to the new automated office from all parties. This can only be done by ensuring that the unique needs and the unique expertise of each group are considered in the OA plan.

The emerging information services function will be staffed with personnel from several different information groups, bringing with them different skills and experiences. A more comprehensive and integrated human resources plan is essential. Organizations must start thinking about the career development of their information services professionals to ensure that the promises of office automation will be fulfilled. OA

O'Hara is a manager in the Management Information Consulting Division of Arthur Andersen & Co. in its Chicago headquarters.

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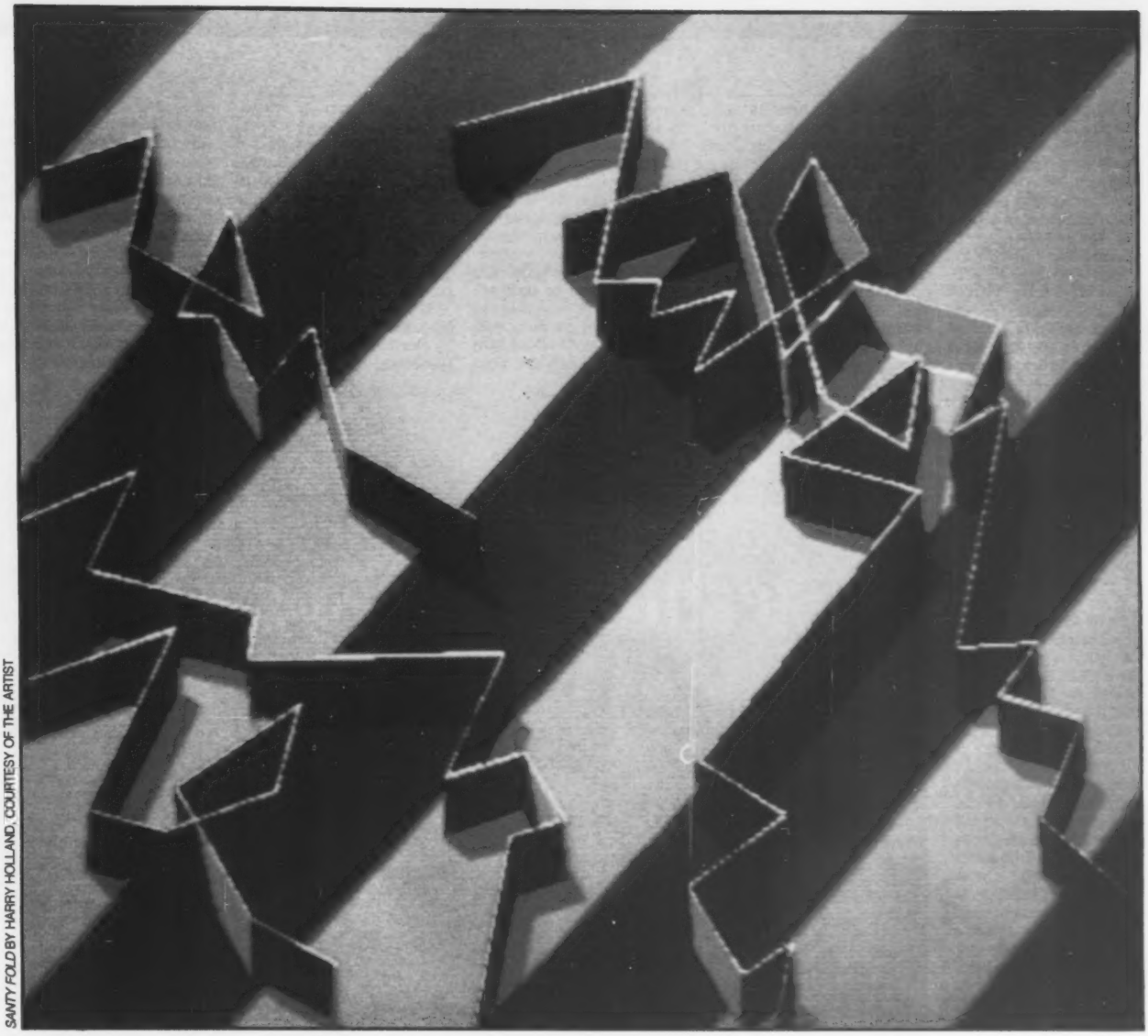

SANTY FOLD BY HARRY HOLLAND, COURTESY OF THE ARTIST

UNLIMITED POTENTIAL

Business Graphics

Who hasn't heard about computer graphics today? We design our products with it (computer-aided design and manufacture [CAD/CAM]), we run our factories with it (process control), we train our pilots with it (simulation), we sell products and make movies with it (computer animation) and we play with it (video games).

And now use it in our office? Of course. Why? Because so much of business data is expressed in tables of numbers and RAMs and reams of printout and most people just can't wade through the pile or understand what's going on without pictures. For much business data, the Chinese were right: A picture is often worth a thousand words — or a thousand lines of code. Graphics:

- Explains complex information.
- Emphasizes key points.
- Shows comparisons.
- Explains new concepts.

Graphics can help make meetings shorter; graphics can help people reach decisions sooner on the basis of less information; graphics can help one reach better decisions; graphics is persuasive; and graphics makes the user look more professional, more interesting, more credible and more organized.

Lest it sound like we are preaching to the choir, surveys show that not all OA users have graphics literacy. Although users with a scientific background accept graphics as the logical way to present data, the same is not true for many users from the business community. Many business

BY CARL MACHOVER

users not only fail to understand graphics presentations, they also mistrust them — they are graphics illiterates.

The *Harvard Business Review*, in its March-April, 1978 issue, found it worthwhile to publish an article, "Graphic Shorthand as an Aid to Managers." This article, by George B. Blake of Anderson, Clayton and Co., said essentially, "Hey, managers, graphics is a great way to show relationships among many figures!" It is difficult to imagine that such an article would need to be published in a similar issue of a technical journal like the *IEEE Proceedings* or the *Transactions* of the Assocation of Computing Machinery.

The situation in the business community is getting better. Their touchstone, IBM, put its blessing on graphics for business applications a few years ago, with the software program Trend Analysis 1370 and, more recently, with the introduction of hardware products like the IBM 3279 color graphics display terminal with associated color hard-copy graphics printer and a wide range of graphics software.

Certainly, business graphics products did exist before IBM (35mm slidemaking systems from Genigraphics and Dicomed Corp. and software plotting packages from Issco, Inc., for example), but realistically, the business world is so dominated by IBM that business graphics had little chance until IBM blessed it.

Realistically, this graphics illiteracy may be a short-term issue. Today's youngsters take computer graphics for granted. Their schools are full of personal computers and their playtime is dominated by video games. The OA worker of the next decade will come to graphics literacy from a lifetime of computer graphics experience.

Business graphics does make sense. But, why computer business graphics in particular? The justification can be drawn from the following:

- Computer business graphics are faster — charts and graphs can be generated significantly faster than they can be manually.
- Computer business graphics provide more variety — thematic maps, 3D data plots (like contour surfaces and manhattan charts) and pictographic charts. Even pie charts can be produced more easily from available software than they can be done manually.
- Computer business graphics can be interactive and responsive; the user can reconfigure data and immediately see changes graphically. And, the manager's "chain of thought" proceeds smoothly, uninterrupted by the normal delays encountered in manually replotting data.
- Computer business graphics may be less expensive. Management Graphics, Inc., supplier of a $90,000 tabletop slidemaking systems, has said its system can be paid off in about two years from the savings in cost per slide when as few as 200 slides per month are produced. Vendors of standalone plotting systems, such as Graphic Control Systems, Inc., which supplies an under-$20,000 chart-making system, has claimed the savings per chart will pay off the system in a reasonable time if even as few as 50 charts per month are produced.
- Computer business graphics can be produced by clerical rather than professional people. For the most commonly used presentations like text, line, bar and pie charts, many vendors provide preformatted structures that require only data entry. The artistic decisions have been made by the vendors' software. More sophisticated presentations still require the professional, but, the preformatted approach certainly satisfies 25% to 50% of all business graphics requirements.

• Computer business graphics can be automatically produced from the user's data. Companies like Cullinane Database Systems, Inc., Execucom Systems Corp. and Applied Data Research, Inc. have developed software that links the plotting packages, so the user need only ask for data and the information is presented in an appropriate graphics form. Products like Visicorp's Visicalc, tied to Visiplot, provide for chart generation from data.

Where can graphics be used in OA? The dominant use, in perhaps 80% of all applications, is in data representation.

Where can graphics be used in OA? The dominant use, in perhaps 80% of all applications, is in data representation. Another use, which, although growing, is still relatively small (about 15%), is the use of graphics as part of the "what-if" environment, reconfiguring with alternates to see what the bottom line will be. The technique can be used in the graphics solution of business problems. Break-even analysis, route analysis, interactive project management — not available yet, but coming — all represent productive applications for computer graphics.

Other business applications for graphics that are not usually included in the charting and graphics mode nevertheless offer exciting potential. For example, most OA environments offer extensive word processing capability. The merger between WP and graphics is just now happening, and this suggests a coming era of OA-produced reports and documents replete with graphics of all kinds. There is now some activity in this area from the CAD/CAM direction, but as yet, few, if any, products have been announced from the OA direction.

Finally, if the OA resource can be viewed as a window into the users' professional world (business graphics, word processing, data bank availability, electronic mail, perhaps even videotext), graphics can bring one additional function to the OA environment — that of graphically monitoring the communications link status of the OA network. Today, companies like Tesdata, Avant Garde and TITN provide stand-alone systems for this purpose. Incorporating these systems into the OA environment would be an attractive venture.

What business subjects are good candidates? The article mentioned earlier listed a number of business subjects that are useful to graph. Included were:

• Economics, including gross national product real growth, population, per capita income, minimum wage, inflation, money supply, money velocity, balance of payments, balance of trade, public debt, price and availability of specific raw materials, futures market and devaluation risks.

• Computers, including machine efficiency, production efficiency, keystrokes per hour, project completion efficiency, input timeliness and output timeliness.

• General topics, including sales (price level and current basis), profits, division performance, variable income, percent of sales, earnings per share, common stock price and so on).

• Personnel, including management by objectives, overhead as a percent of sales, labor contract settlements, safety records, number of employees and salary increases.

How can the OA user accomplish these miracles? What are the tools? Fortunately, (or perhaps, unfortunately, because the array is bewildering), many alternatives are available. The user can:

• Operate CRT terminals and hard-copy units (in either dumb or intelligent configurations) from the host computer, using software resident in the host (a typical IBM mode, using the IBM 3279 printer, and IBM or SAS Institute software).

• Use stand-alone CRT systems that contain all software needed for analysis and data presentation (a typical Computer Pictures mode).

• Use terminals connected to a commercial time-sharing service (such as NCSS).

• Subcontract graphics requirements to a service bureau (like those Genigraphics offers).

• Purchase hardware and software components from multiple vendors and assemble his own system.

• Purchase hardware and write his own software.

The choices continue. Some systems contain links to the user's data base, while others do not. Some systems require knowledge of programming; others do not. Some accept English-like commands; others continually prompt the user to fill in the blanks. Some make artistic and graphics decisions; others do not. Some systems are capable of producing presentation-quality graphics (suitable for publication or public showing); others produce peer-quality graphics (suitable for showing to one's associates).

Some systems provide color capability and others do not. Further, systems provide a variety of hard copy, including paper, overhead transparencies and 35mm slides. Some hard-copy systems are suitable for high-volume applications; others need to be limited to low-volume use. The user interface can be a keyboard, a graphics panel, a touch screen, a mouse and, perhaps, voice.

Obviously, the purchaser must have an intimate knowledge of the application requirements and the user ability (and bias) before he can select the best system. There is a combination that is best for a particular situation, but there is no single combination suitable for all situations. Real life being what is is, compromises are inevitable.

Does the user think it's worth it? Sure. The *Harvard Business Review's* George Blake said, "There are surprising benefits to converting information into a 'geometric metaphor' . . . And, there is something smugly satisfying about boiling an ocean of paper down to a single sheet."

As a card-carrying capitalist, the author concedes that final success is determined by the marketplace. The marketplace is expected to buy about $500 million worth of business graphics in 1982. Continue that blistering pace at about 40% per year and, by the end of the decade, the market will increase by more than 10 times to over $6 billion.

Business graphics is well on its way to being an integral part of OA. OA

Machover is president of Machover Associates Corp., a management consulting firm based in White Plains, N.Y.

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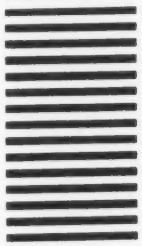

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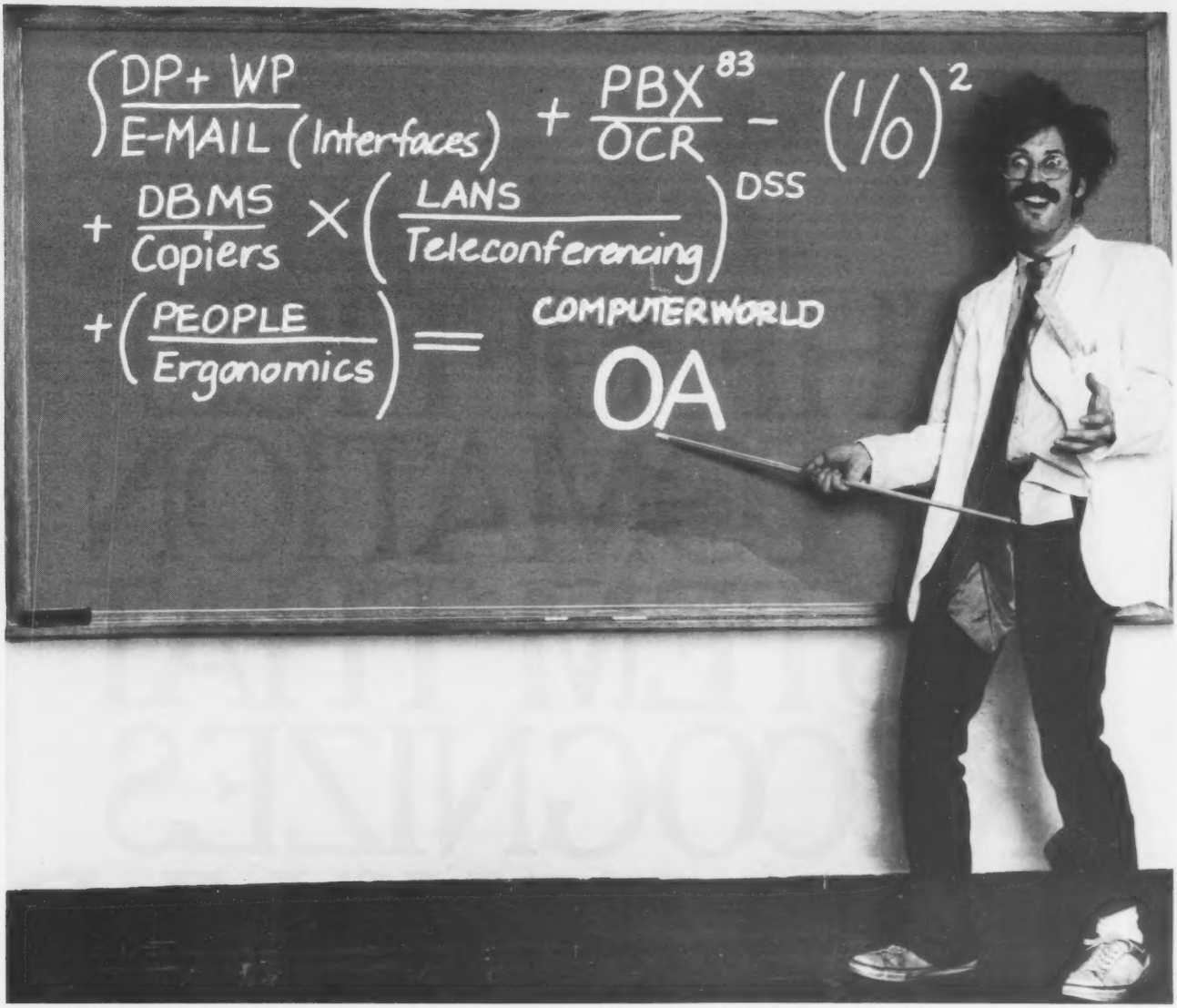

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USER INVOLVEMENT IS THE GOAL

TEAM WORK

BY THOMAS R. CONROY
AND JACQUE BIEBER

The early stages of word processing were a classic example of inappropriately applied technology and unfulfilled expectations. Then, slowly, the term "office automation" began to expand outward, taking on ever-increasing layers of meaning, ingesting whole new technologies in a single gulp — electronic typewriters, dictation systems, photocomposition, printers, copiers, optical character recognition, private branch exchanges, local-area networks, electronic mail, teleconferencing, office design (in some instances) and, finally, the personal computer.

These labor-saving devices can improve office worker effectiveness dramatically. However, many modern offices continue to operate as if these technologies do not exist. Programs are started and systems installed, but the results do not match expectations. Despite business' desire and need to improve the effectiveness and quality of work life, the solutions to productivity problems remain elusive. The obvious conclusion is painful — technology is only part of the solution.

A more holistic approach to the problems of the office is a program that helps users successfully design and implement their own automated offices from beginning to end. A user-developed program can bridge the gap between the promise and the reality of OA.

Before examining the characteristics of a user-developed program, consider these questions: Why does this incredible gap exist between that which is technologically feasible and that which is used in day-to-day office activities? And how can a user-developed program bridge this gap?

There are several reasons for this discrepancy between the probable and the practiced:

- Traditional computer systems implementation methods have not been effective.
- Little is known about how the office functions.
- Office workers are not well educated in new technologies and their potential.

Traditional implementation methods for computer systems lack real user involvement. Typically, user requirements were developed and system specifications were designed reflecting the systems analyst's point of view. Users did not really participate in the process until the final phase, when they would be expected to operate the system. They were often reluctant to accept the new technology because conditions had changed since the system had been designed. System designers and users found themselves caught in a phenomenon best described as the Bermuda Triangle (see Figure 1 on Page 62).

Everyone was affected and, instead of experiencing improved productivity, users found equipment would sit idle or not be fully utilized. Today, we call this the Law of Diver-

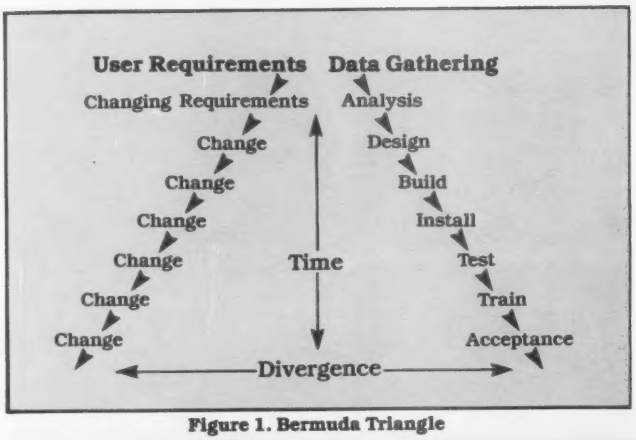

Figure 1. Bermuda Triangle

gence. The Law of Divergence recognizes that the office is dynamic. It states that the longer it takes to build a system, the further it will be from user needs unless the user actively participates in the entire process.

A "people-are-extensions-of-machines" philosophy underlies this traditional method. What is needed is a "machines-are-extensions-of-people" philosophy. User-developed programs will not allow the Law of Divergence to interface with the successful introduction of technology, and the Bermuda Triangle will no longer exist.

Little is known about how the office really operates. Using traditional implementation methods, those who had access to the best information on how it functions — the office workers — were not fully participating in the process. Yet, who knows better how the office functions than office workers? Instead of applying some global theory, office workers can, with the help of experts, identify their problems and develop ways to use the appropriate technology to solve those problems.

Finally, a user-developed program directly addresses the issue that office workers are not educated in the new technologies. While traditional methods attempt to train reluctant users on how to use the equipment once it is installed, a user-developed program first educates the user on improving office processes. The user then decides which technologies to implement.

The motivation to learn how to use the system is built into the process. When users actively participate to improve their environment, they become proactive rather than reactive. Such participation results in less confusion, fear and resistance to change. At the same time, it fosters an employee attitude of shared responsibility for the success of the office and the organization.

What are the characteristics of a user-developed program? Users are guided through the phases or steps necessary to introduce technologies successfully into the office by trained implementation consultants. These consultants combine expertise in group process and technology. Each step in the process — orientation, analysis, planning, implementation and evaluation — is designed to enhance user involvement, commitment and responsibility. The phases of the program are orientation, initial planning, project planning, project implementation, measurement and evaluation.

Before addressing the actual phases, we should point out that user-developed programs are based on two assumptions:

- All employees are responsible for improving office productivity.
- It is easier for office workers to understand the technologies than it is for systems analysts to understand how an office really functions.

Phase I: Orientation. The orientation phase sets the stage for all subsequent action. During orientation, a steering committee of top executives and managers is introduced to the user-developed concept and program. When the committee understands the program, executives and managers develop an overall strategy for implementation.

This strategy includes goals for the program, an assessment of current office conditions and a selection of office technologies that will be included in the company's resource center.

Every company should develop

its own resource center as part of its program. A resource center may be a physical location where users can go to see the technologies and learn about them, or it may simply be a catalog of technologies they can use in their projects. Trained OA consultants are available to answer questions and to help with all phases of implementation.

Resource centers are available to all user teams and provide the information and hands-on exposure that team members need to decide which technologies to implement. The steering committee selects the technologies that will be available and also decides on program goals. Generally, the goals will be to assist users in:

- Identifying and clarifying their roles in office productivity improvement programs.
- Gaining the necessary knowledge and skills that will enable them to design their own systems and use the technologies.
- Implementing office productivity and quality of work-life improvements through the continuing use of office technologies.

After the steering committee has established the parameters and goals of the programs and has articulated its commitment to those goals, the program is introduced to all employees through presentations, newsletters and informal discussions. This corporate awareness campaign is designed to raise the corporation's level of awareness about OA, to inform all employees about the program and to recruit volunteers for the office productivity teams.

This awareness campaign prepares the organization for upcoming changes — changes that will affect how individuals, departments and organizations operate.

The final event that occurs during the orientation phase is the formation of teams. Office productivity teams consist of seven to 10 volunteer members who represent various levels and work areas in the organization. By involving employees from a variety of job classifications, the process elicits broad perspectives and produces results that are more workable at all levels.

Phase II: Initial Planning. Each office productivity team begins Phase II by attending an intensive workshop on organizational needs assessment, covering topics from group process skills to interviewing techniques. Workshop activities stress learning by doing. Teams participate in a brainstorming session in which they not only identify barriers to productivity in the office but also conduct interviews with others in the organization to validate their claims and foster interest in and ownership of the project. The first exposure to the technologies occurs during this phase, when team members begin to formulate solutions to the problems they have identified.

Change must come from within the user organization, and a user-developed program puts the user in charge of the change.

By the end of Phase II, teams have identified and prioritized a number of improvement projects they want to implement. This portfolio of projects is presented to the steering committee, which approves projects for implementation or further study.

Phase III: Implementation. Phase III plan development is one of the more intricate and detailed parts of the program. It begins with a workshop where team members analyze their work flow, learn more specific information about technologies, cost-justify their ideas and design and develop their own implementation plan.

During this phase, team members learn how to coordinate the actual implementation of the projects. They decide how to present implementation reports and updates to management and identify some of the benefits they think their project will deliver. Although team members are encouraged to look for cost avoidance and cost displacement benefits, the intangible benefits should also be articulated.

Benefits may, but need not be, the result of automation. Some intangible benefits that accrue to team members and other employees are benefits like, "feeling better and more excited about work," "feeling a new sense of belonging and ownership" or "knowing more about organizational objectives and how each employee contributes to those objectives." Many productivity improvements can be gained simply by doing things better — through work simplification, improved communications or task elimination.

Another part of planning is spreading commitment to the plan. Team members need to work directly with those parts of the organization responsible for the tasks they want accomplished. The team might go to the purchasing department and find out about the purchasing process. It might go to facilities and discuss the requirements of installing new equipment. If a process is crucial to implementation, it should be researched during the planning phase.

Because each project is evaluated upon completion, the team identifies its evaluation methods during the planning phase. Any tools needed to collect data or track progress are incorporated at this time. Thus, the groundwork is laid for every step of the implementation process.

The final step in Phase III is gaining steering committee approval for the projects. Just as the entire program plan needs careful planning on the part of the steering committee, so, too, each project needs an implementation plan. Such planning assures that the rest of the organization will be properly introduced to the changes and sufficiently trained.

Phase IV: Implementation. The planning phase is detailed and exhaustive. This intensive planning tends to streamline the implementation phase. When the planning groundwork is properly laid and all participants and potential users are prepared for implementation, the actual implementation phase can begin.

Implementation is a time for action. Team members return to the organizations that will be responsible for activating parts of the implementation, for example, purchasing and facilities. Team members coordinate implementation activities and carry out the plan they developed.

Phase V: Measurement and Evaluation. Completed projects receive careful evaluation. Evaluation methods were built into the plan. The team's task during evaluation is to compile the evaluation information and analyze the results. A measurement and evaluation workshop helps team members to accomplish this goal. After evaluation is complete, a final presentation is made to the steering committee.

But this is not the end of the program. It is simply the completion of one cycle. A user-developed program is designed to keep pace with the dynamics of the office. It is not a stagnant, one-time event. Rather, it is iterative and self-propelling. A user-developed program will release the creative potential of team members. More than likely, team members will have learned some things during the first cycle that they want to use in continuing cycles.

At this time, teams return to Phase II to explore new needs or to reexamine project ideas from cycle one. As participants acquire the skills to work the process, it will consume less time and become more effective each time the cycle is repeated.

Such a program can enhance organizational profitability by improving individual and organizational effectiveness. For the organization, benefits are:

- Improved communications.
- Setting of realistic goals and achieving results.
- Fostering of creativity and individual initiative.
- Establishment of ongoing process established.

The individual has benefited because he has:

- Developed skills in:
  - ☐ Group problem solving.
  - ☐ Communications.
  - ☐ Group participation.
  - ☐ Change management.
  - ☐ Planning, implementation and evaluation.
- Achieved technology literacy.
- Improved his understanding of organizational mission.

A user-developed program is a process that can be continuously applied, and one that assures the appropriate problem-solution match. It will improve productivity and maximize the effectiveness of technologies while minimizing the impact of introducing change into the office. Change must come from within the user organization, and a user-developed program puts the user in charge of the change.

It is a process that will not become obsolete; the available tools and resources will continually be updated and expanded. The process itself is a long-term, essential ingredient for ensuring improvement in office effectiveness and quality of work life. Once a user-developed program becomes part of the fabric of an organization, it then becomes a constant source of reflection and renewal. **OA**

Conroy is director of office technologies, Control Data Corp., Minneapolis, and is responsible for developing programs to introduce new automation technologies into the office. Bieber designs educational programs for Contemporary Courseware, Inc., an instructional software company in Minneapolis.

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WHEN YOU CAN'T GET AWAY

Teleconferencing

Teleconferencing is characterized by several different methods, each influencing its implementation and use. Built on the familiar lines of conference calls, audioconferencing requires listening skills and enhances the effectiveness of those who are verbally articulate. Videoconferencing, superficially similar to television broadcasting, is predominantly visual in nature and therefore allows body language to be used to back up verbal persuasiveness. Computer conferencing, an enhanced type of electronic mail, places a premium on reading, typing and writing abilities.

Time dependence is another important characteristic of teleconferencing options. Videoconferencing and audioconferencing take place in real time, which means participants must schedule specific periods

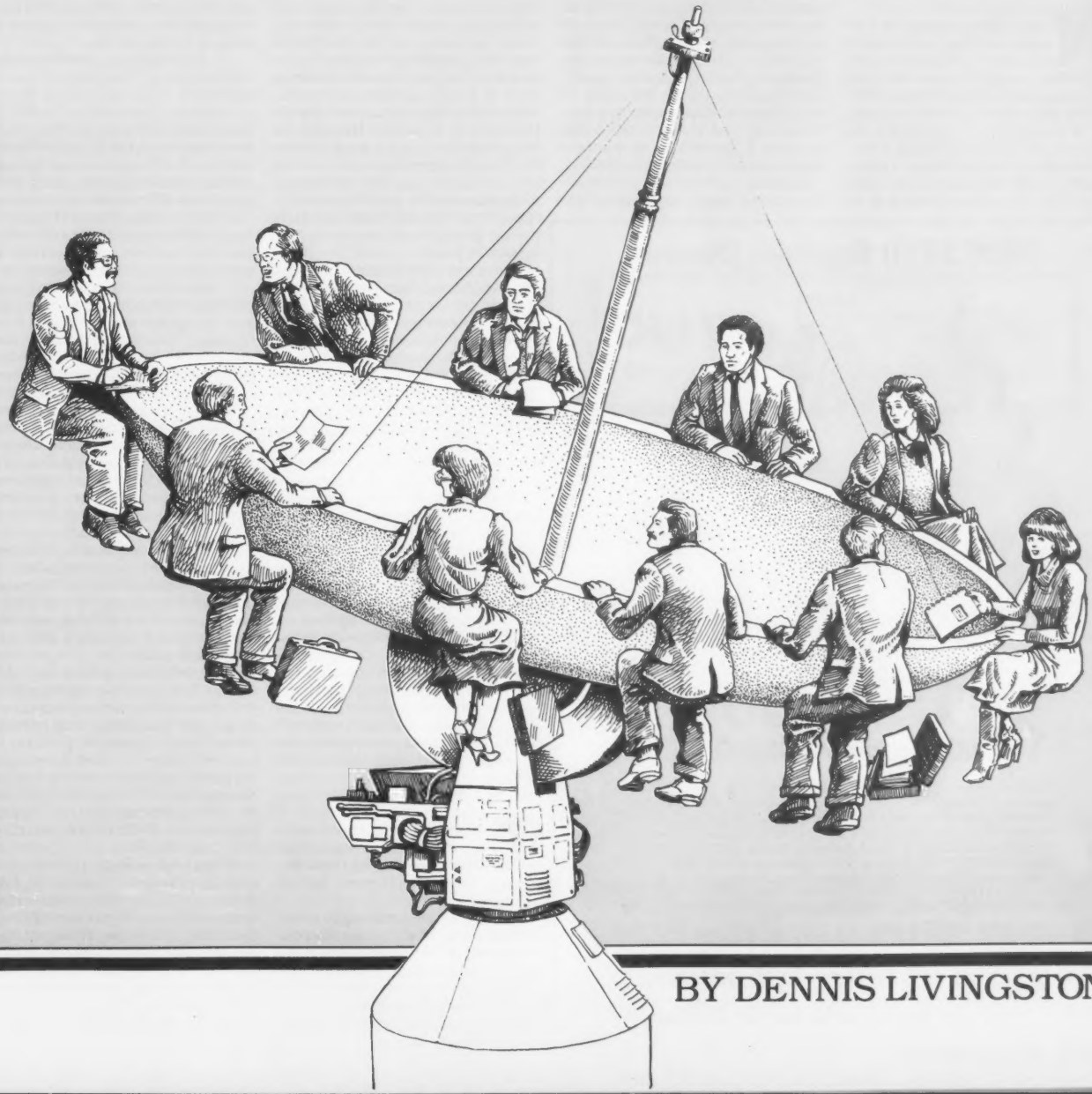

ILLUSTRATION BY GREG WENZEL

BY DENNIS LIVINGSTON

when they are available for the session. Computer conferencing can also take this form, but it is more usually and usefully carried out asynchronously. Conference members can enter and receive textual information at any time that is convenient for them, which facilitates the exchange of messages across widely dispersed time zones. Conferences can be continued in a flexible, open-ended way until they have run their course.

Geographic accessibility of each mode may also play a role in the ways and extent to which that mode is used. Videoconferencing and some forms of audioconferencing are location dependent, which means participants must assemble at a designated site — an off-premise (public) or in-house (private) studio or specially prepared room. Other forms of audioconferencing are accessible from any ordinary telephone, as is computer conferencing.

Naturalness may be the most subtle, subjective quality distinguishing teleconferencing formats. Naturalness is partly a technical function of the friendliness or transparency of the software that links the user to the system. Many first-time users of teleconferencing implicitly judge its naturalness and, therefore, its utility, according to their experiences with the richness of visual and verbal cues embedded in face-to-face meetings.

By this standard, the density of human communication channels may seem increasingly restricted as one moves from full-motion video, to slow-scan or freeze-frame video (in which an image remains on the screen for a period of seconds), to audio, to computer conferencing.

For new users, audioconferencing can be strangest of all. It is completely lacking in physical interaction, entry is based solely on keyboarding and feedback is not immediate in asynchronous use. Technologically, however, audioconferencing may seem to be more natural than computer conferencing and videoconferencing because it appears to be a simple extension of the telephone call.

Finding uses for teleconferencing in the business world rests on two fundamental realizations:

• Not every kind of human meeting needs the interpersonal touch. Functions such as sales calls, negotiating and bargaining sessions and establishing acquaintance with strangers are all better carried out face to face. However, a wide range of meetings — by some estimates, as much as 30% of all business trips — are potentially amenable to teleconferencing.

• Teleconferencing can be more than just an efficient way to hold meetings. Particularly when in-house premises are used, individuals who would not ordinarily be chosen — or who would not have time — to attend face-to-face sessions can be drawn in. As a result, the circle of expertise that can be brought to bear on an issue is wider. The concentration required by teleconferencing also produces more productive meetings, more opportunity for equitable participation and greater focus on the subject at hand.

Computer conferencing has its own additional benefits, beyond the convenience of asynchronicity. A continuous written record is kept of conference messages, which can be accessed by author, date of entry and key words. Not only is more deliberation possible before one replies to comments, but also the lack of physical cues and the option of anonymous entries imply that a user's contribution will be evaluated on its own merits. Often, participants are surprised to learn peer group conversation has occurred with individuals whom they might have ignored in person.

As a control against information overload, conference members always have the option of spinning off discussions on more specialized topics. Over time, then, a mature conference resembles a tree, with various branches (subconferences) sprouting from the main trunk and each individual free to restrict participation to those topics of most significant concern.

A wide range of meetings — by some estimates, as much as 30% of all business trips — are potentially amenable to teleconferencing.

Taking these factors into account, most organizations have used teleconferencing for three basic functions:

• Information exchange, such as engineering data, sales figures, budget projects, policy forecasts and survey research results.

• Problem solving, by tapping the expertise of conference members and by using group decision-making techniques, such as brainstorming.

• Task and sales force coordination, especially among individuals who are geographically and/or organizationally dispersed.

In turn, these functions have been reflected in the following representative teleconference activities:

☐ Administrative conferences and project management. Many companies have used a variety of teleconferencing modes for scheduling meetings of managers and for coordinating projects. For example, IBM, Atlantic Richfield Co. (Arco), M/A-Com, Inc., Aetna Life and Casualty Co. and Digital Equipment Corp. have each established dedicated videoconferencing systems to link a number of company offices.

☐ New product announcements. Video systems have found particular favor for this task, and several national hotel chains are planning or establishing facilities. Such systems tend to be asymmetrical, with video and audio outgoing, but only audio returning from meeting rooms.

☐ Emergency coordination and planning. The primary example of this is the Institute of Nuclear Power Operations' use of Infomedia's Notepad. The institute uses Notepad to link individuals in all U.S. and several foreign nuclear power plants, along with a number of reactor core vendors and engineering firms. This ongoing meeting enables members to discuss nuclear plant safety as well as to report on emergencies.

☐ Education, training and consulting. Both videoconferencing and computer conferencing lend themselves to educational use. The asynchronous aspect of computer meetings is particularly useful for executives who would not otherwise have the time to travel to management seminars. Similarly, via Hinet, the National Association of Realtors organized a seminar for 5,000 participants on creative financing. At least one consulting firm, N. Dean Meyer & Associates, is planning to use an audio system operated by Connex International to organize a multiclient-sponsored Office Automation Teleforum, which will allow members to have a dialog with selected experts and each other at scheduled times.

☐ Conference planning. Although teleconferencing may never replace the social pleasures people get from attending professional conferences in person, it can help plan for such meetings. A recent example is the use of Notepad by the Association for Information Processing, Inc. to put together the 1982 Office Automation Conference.

When implementing teleconferencing, planners should employ strategies that encompass the same commonsense rules applicable to OA as a whole. However, teleconferencing planners must also take into account a particular set of technological, economic and human-factor issues.

Pioneer conferencing systems

inevitably revealed various technical flaws. Computer conferencing has been hindered by a lack of graphics capability and the complexity of some menu command structures have been hindrances. Audioconferencing participants have been inhibited by the relatively lower quality of nondedicated lines for conference calls, poor acoustical properties of meeting rooms and the tendency of sound-sensitive microphones to orient themselves to the loudest prevailing noise. Videoconferencing has suffered from malfunctioning equipment, obtrusive cameras, lack of satellite capacity and difficulties in establishing multisite and intercompany communications. In all modes, ensuring the privacy of privileged business information has been a continuing concern.

Nevertheless, these technical barriers are being addressed. Currently available systems are less intrusive, more mobile, more flexible, easier to use and more secure than those of only a few years ago. There is every indication that technology is continuing to evolve in favorable directions.

Cost-justifying teleconferencing must involve weighing both quantitative and qualitative factors. The most common approach is to compare the cost and time advantages of electronic and face-to-face meetings. When rising transportation and hotel costs, wear and tear endured by managers shuttling between meetings and the minimal marginal costs accrued by adding people to a conference site are taken into account, teleconferencing frequently leads to substantial cost savings over traditional gatherings.

Obviously, the differential will vary according to location of the teleconferencing site (on- or off-premise), use of third-party services for organizing the session and sophistication of equipment. It has been estimated that, in general, 15% of annual U.S. business travel costs could be saved through the use of all forms of telecommunications.

Some available estimates from the video field are suggestive. Arco expects to reduce its travel costs by 23% as its systems becomes fully operational. DEC expects a payback time of 18 months if its studios are used 80% of the time. Picker Corp., a medical equipment manufacturer, compares its use of Hinet, at a cost of $80,000 in 1980 at 29 locations, with its expense of $420,000 for a similar traditional meeting at one site in 1974.

Some qualitative variables should be added to these calculations, such as the perceived greater efficiency of teleconferencing meetings, flexibility of scheduling, mitigation of the frustration created by endless rounds of telephone tag and lost messages, speedy access to business intelligence and the opportunity to experiment with decentralized decision-making patterns.

Attempting cost comparisons of teleconferencing modes with each other is an apples-and-oranges affair. A word processor is more expensive than a pencil, but both can be justified on their own grounds. This said, the current relatively high expense of full-motion, in-house video puts this format out of reach for all but the largest corporations. Audiographics and slow-scan video systems can also accomplish many tasks for which full-motion video might be used.

Computer conferencing is least interchangeable with the other two modes because of its unique asynchronous and written record features. Indeed, it could be used as an adjunct or complementary system to videoconferencing or audioconferencing.

Finally, human factors play a vital part in determining the effectiveness with which teleconferencing is implemented. Some general lessons have already emerged from conferencing experience. Audioconferencing and videoconferencing, at least on a sustained basis, are most effective among individuals who already know each other or have some kind of peer group relationship. Perhaps surprisingly, computer conferencing is not necessarily limited in this respect, and participants have even found ways to detect personality traits and emotional states that lie behind the printed messages the exchange.

Some people would be loathe to give up travel. It is a sign of status to them or at least a convenient reason to get away from office routine. Others, however, may not feel this way. A study by Bell Canada indicates that 45% of those who travel at least 15 times a year would prefer to reduce their trips, while only 16% of those who traveled less than five times a year had this desire. In this respect, it is often noted that high-level executives are not likely to be willing to go to off-premise audio and video studios, at least beyond an intial demonstration "show and tell."

When used most flexibly, teleconferencing enables individuals to communicate directly with each other across departmental and other organizational barriers. This is precisely what makes teleconferencing a valuable tool for facilitating matrix management styles. By the same token, some managers may feel uneasy as they come to understand the long-range potential of teleconferencing for subverting hierarchical patterns of authority. Individuals may find their power bases shifting in response to the differing communications skills each conferencing option stresses.

Some people would be loathe to give up travel. It is a sign of status to them or at least a convenient reason to get away from office routine. Others, however, may not feel this way.

Learning to use the systems in a technical sense may not be an arduous task. However, adapting to the more unusual characteristics of teleconferencing may take more time. Unlike face-to-face meetings, audioconferences will not necessarily afford clear indications of who is preparing to speak next at a distant site or even whose voice is attached to what body. Some participants may unconsciously take on performing airs when confronted with video equipment, interfering with the spontaneous flow of conversation. Computer conferencing confronts the new user with the sensation of spirit beings tapping out messages from the void, along with the strange ability to carry out multiple conversations with others under varying, contiguous conditions of openness or privacy, within the same conference.

Perhaps the most important single factor in easing the way for teleconferencing users is the quality of leadership behind each session. Unless a meeting is deliberately intended to operate in unstructured fashion, a successful teleconference usually requires the presence of someone who can make introductions, welcome new participants, take up slack in the conversation, ensure that everyone has received an agenda beforehand and, for computer conferences, maintain a level of continuing commitment that is crucial for meetings on this mode.

Teleconferencing can change the nature and quality of meetings themselves, and the way an organization structures itself may begin to change for the better under the impact of the teleconferencing environment. OA

Livingston is a consultant in office automation based in Cambridge, Mass.


"Any chance we can pull manufacturing data into that 'what if' study?"
"That overnight update? I already sent it to all 60 sales managers."
"Great. Now they can spend all day using the news, not waiting for it."
"Don't worry, if it exists in the company database, I can bring it up right here."
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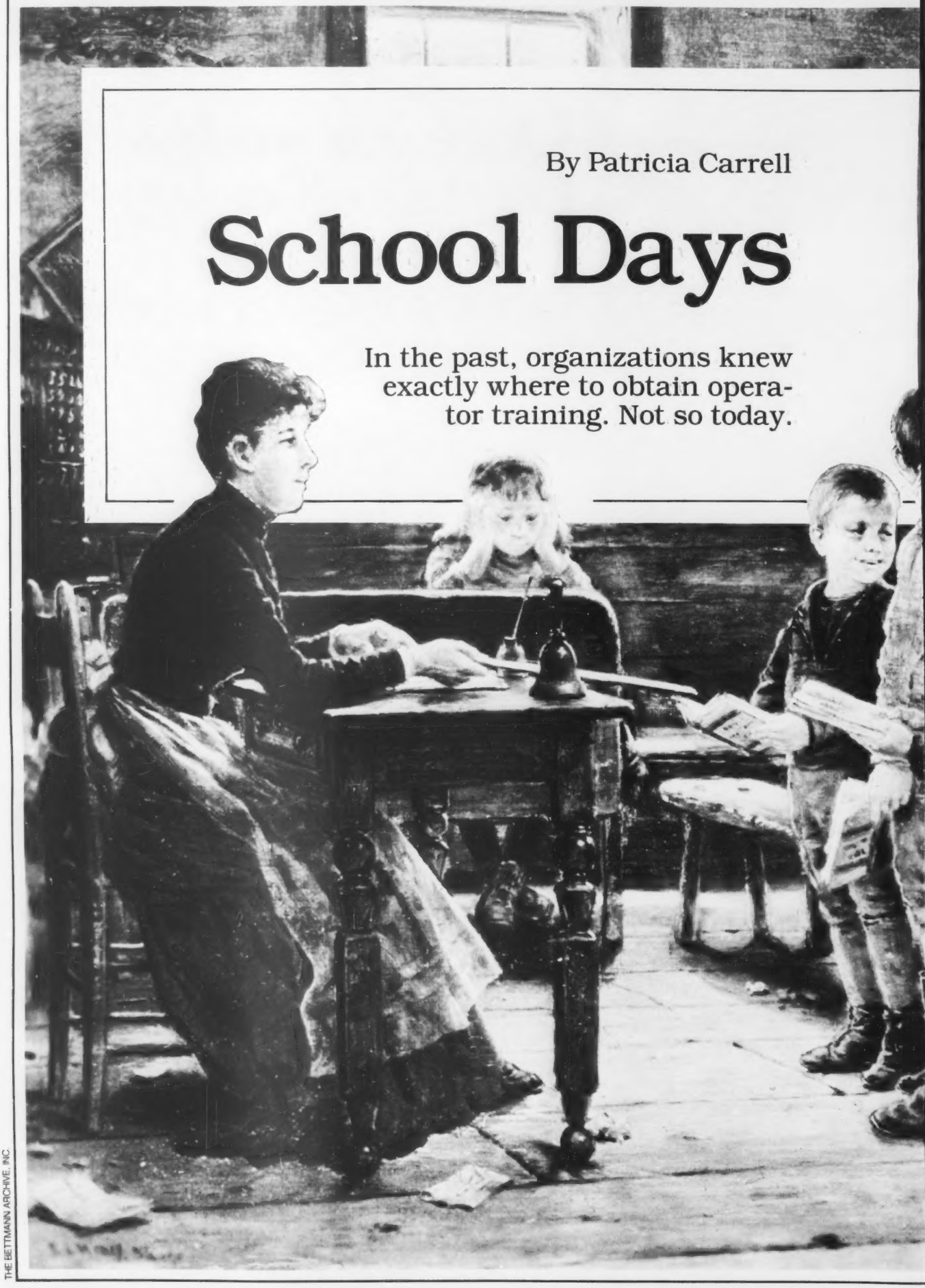
By Patricia Carrell

School Days

In the past, organizations knew exactly where to obtain operator training. Not so today.



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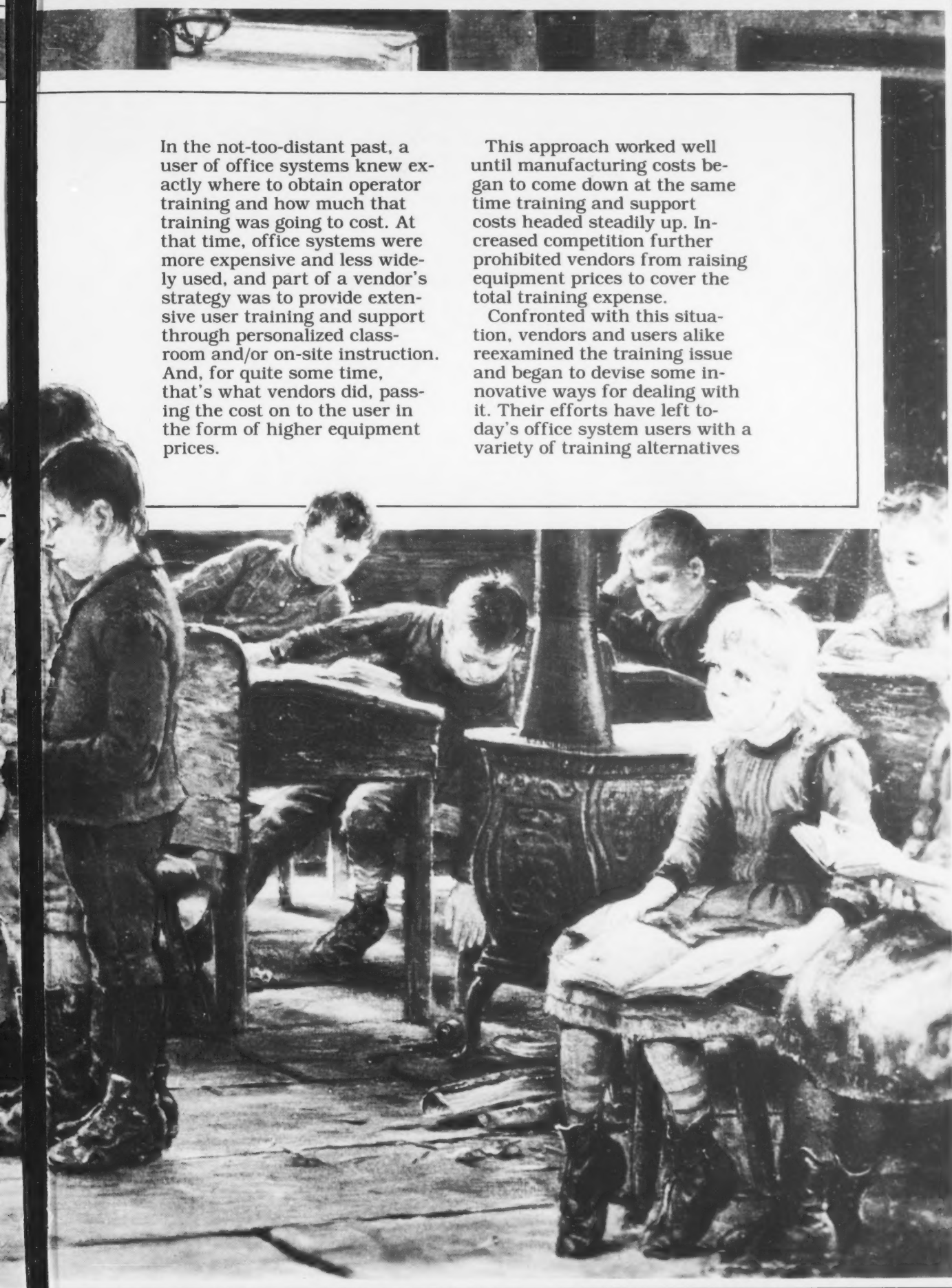

In the not-too-distant past, a user of office systems knew exactly where to obtain operator training and how much that training was going to cost. At that time, office systems were more expensive and less widely used, and part of a vendor's strategy was to provide extensive user training and support through personalized classroom and/or on-site instruction. And, for quite some time, that's what vendors did, passing the cost on to the user in the form of higher equipment prices.

This approach worked well until manufacturing costs began to come down at the same time training and support costs headed steadily up. Increased competition further prohibited vendors from raising equipment prices to cover the total training expense.

Confronted with this situation, vendors and users alike reexamined the training issue and began to devise some innovative ways for dealing with it. Their efforts have left today's office system users with a variety of training alternatives

from which to choose. The training programs available today come from three major areas: vendors, public and private institutions and in-house trainers.

Vendors vary considerably in the types of training they offer. Approximately 25% still provide formal classroom training. All offer free training for the first operator and backup operator training is available for a fee. Nearly 60% of the vendors provide monitored, self-paced packages and the remaining vendors provide independent, self-paced packages. All vendors offer some form of advanced training seminars.

Self-paced training programs were given a tremendous boost by IBM when, with the announcement of the Displaywriter, it not only announced a new product but also sanctioned a newly emerging approach to operator training. Rather than provide personalized instruction as it does with other products, IBM proclaimed that a self-paced manual would accompany the Displaywriter and operators could train themselves in their own offices, at their own pace.

The self-paced approach offers a number of advantages. The presentation of information is consistent — all trainees receive the same information in precisely the same way.

Self-paced training programs consist of a number of components including audio-cassettes, prerecorded diskette exercises, reference manuals, workbooks and specialized application training booklets. Each vendor has its own unique way of putting these components together.

The self-paced approach offers a number of advantages. The presentation of information is consistent — all trainees receive the same information in precisely the same way. If well written, the self-paced approach can eliminate the uneasiness that often accompanies formal competitive classroom training. Trainees also have greater control because they can progress at their own pace and review sections of the material at their own discretion.

Opponents of self-paced instruction believe effective training results can be obtained only from a formally conducted classroom program. They believe mechanized instruction cannot replace a good instructor and standardization of training will not provide the theory and applications information the user may require. In some cases, this may be true — but not in all.

Institutional training includes courses offered by colleges, technical and trade schools, temporary employment agencies and private consulting and training organizations.

Most traditional educational institutions have now incorporated word processing and other related courses into business and office curricula. Opportunities range from introductory classes in community centers to the use of advanced computer mainframe WP programs on multiterminal networks.

Colleges and universities can provide good training if they have adequate hardware and skilled instructors. However, because there is frequently not enough equipment to go around, many schools provide too much theoretical and too little hands-on training, resulting in inadequate hands-on experience. The lack of qualified instructors is another problem. Most college business instructors have not been equipment trained, so colleges must seek qualified professionals from the business community.

Community colleges, vocational schools and four-year colleges offer WP education and training leading to a one-year certificate, associate degree or B.A.

Professional and technical trade schools, when totally dedicated to WP training, are viable alternatives to an academic institution. Generally, these institutions offer a great deal of hands-on experience from instructors who are equipment-oriented. Smaller classrooms and individual attention shorten the training period and provide comprehensive knowledge of the WP equipment.

Although educational institutions are making tremendous progress in offering WP training, demand still exceeds supply. Ideally, an inexpensive, short-term course that could adequately prepare an operator for an entry-level WP job is needed.

Temporary help agencies have attempted to fill this need. Kelly Services offers a four-hour orientation film that emphasizes a total WP concept and lets operators fit the various systems and their functions into the concepts that have been presented. When the concepts have been mastered, the operator receives a few hours of hands-on training on customer equipment.

Olsten Temporary Services trains equipment operators using a modular audiovisual program in conjunction with a CRT terminal, training diskettes and a self-paced manual. Through detailed customer files, Olsten then attempts to match client needs with operator skills.

A number of private WP schools have begun to open where students at varying skill levels can learn in a school setting. Although the majority of these private schools offer formal classroom training in their own facilities, a few will actually do on-site training at a customer's office. Many also offer workshops on advanced functions.

Many firms are now developing their own in-house training programs. These firms have found in-house training is cost-effective because it allows management to custom-design training to meet specific company needs. In-house training programs are as varied as the users that have instituted them. They range from unassisted training out of a manual for a new WP operator in a small office to large training centers sponsoring continuing programs and seminars on special applications. The smaller the user, of course, the smaller the budget for in-house training programs. Usually, smaller users must turn to outside sources. Those who do not use outside sources often attempt to provide training through a lead operator, whose duties are divided between training the new employee and handling his own regular job responsibilities. Even if the trainer is capable of providing adequate training, the trainee is usually short-changed because the trainer often cannot spare the time required for oral instruction. Many low-budget in-house training programs are often placed in environments not conducive to learning. Distracting noises and interruptions can greatly reduce the effectiveness of training and increase the time it takes to accomplish it.

In spite of the problems and cost associated with the establishment of an in-house training program, particularly for smaller users, training responsibility seems to be gradually shifting from the vendor to the user. Vendors now believe that, if users expect systems at fairly low costs, they must be willing to shoulder some of the training burden. In that vein, vendors began developing effective training tools — the self-paced training package — to help users help themselves.

Many companies, especially those with large numbers of installed systems, find the only way to ensure an adequate supply of trained operators is to train their own. This is an ideal solution for large organizations. Because programs can be customized to meet specific users' needs, the problems caused by turnover are greatly reduced and the time required for training is lessened. This customized training is actually less costly per employee. From the start, the trainee learns the system within the framework of that employer's own needs and can, therefore, learn productive skills in less time.

In the future, we will begin to see machines that can be programmed to do the training for us. As a result of increased power and enhanced versatility of newer systems, this approach is already being used with some success in the academic environment. Machines will be able to adjust their responses to meet the needs of the person using the computer at any given time. The computer will be capable of "understanding" a range of common words and phrases to which it can respond appropriately — similar to the way humans actually exchange information.

Looking even further into the future — 1990 and beyond — we will see powerful interactive computers capable of having extensive conversations with users. This means the computer could verbally give the operator instructions and information about errors. The operator, in turn, could ask questions verbally. The services provided today by the manuals, audiovisual devices and instructors will be integrated into tomorrow's systems and software.

Until such advanced self-training systems are available, however, users must cope with the inability of vendors to meet growing support demands. How can the average office systems user know what methods are most effective in meeting its specific needs? In evaluating vendor training packages, users can apply some basic guidelines:

- Does the vendor offer a conceptual introduction to the applications in general and to its system in particular?
- Does the training program progress in a modular fashion, with one concept building upon another? Progression should start with the simple and proceed to the complex. It should be possible to leave out entire sections of the package, if they are not needed, with no noticeable effect on the remainder of the package.
- Are the reference manuals thoroughly indexed so that operators can find information easily and quickly when questions arise?
- Is quick help available by phone if problems occur? Vendor hot lines should not be busy when called and support representatives should be capable of providing quick and accurate answers.
- What do other users think of the package? The best way to get an honest assessment of a particular vendor's training and support program is to ask those who have used it. More than one reference is recommended because what was good for one user may not have been appropriate for another.
- Does it fit in with your operators' prior experience with office systems? Those with no previous exposure often require individual attention, while those with some experience do beautifully on their own with a well-written self-paced training package.

Needless to say, no single training package can satisfy the needs of all users.

In evaluating training programs offered by public and private institutions, two critical issues should be examined:

- The equipment knowledge and experience of the instructor.
- The amount of hands-on training the student will actually receive.

A program that offers one hour of hands-on training weekly is not adequate. Learning to use an office system is much like learning to use a typewriter: True skill is developed only with repeated use and application of basic techniques. In addition, a school that offers some customized training to incorporate a user's own applications should be favored over one that offers only basic training and some generalized applications training. It is wrong to assume that the average operator equipped with only basic skills and general applications knowledge can readily determine how his own applications should be processed on the system.

Again, graduates of these schools are the best sources of information on the quality of these course offerings.

An in-house training program, if properly implemented, is the only viable solution for consistently providing high-quality training that meets specific user needs over the long term. This does not mean vendor training packages should not be used. On the contrary, vendor-supplied packages should be the cornerstone of an in-house training program.

Since many of these packages have been developed by professionals and are helpful, they can provide a sound foundation for actual equipment training. An in-house program would augment good vendor packages by including many of the user's own applications.

The in-house training program, however, will really begin to earn its way when it starts to deal with issues that vendors and private and public institutions cannot easily address — the training of professionals and other service groups in the organization whose work is to be processed on the systems. Users should understand the capabilities and limitations of installed equipment and be able to identify new applications. When this understanding exists, users are far less likely to place unreasonable demands on the system.

Users should also know how to interface with system operators to minimize problems in processing their work. This is especially important with centralized WP centers or smaller satellite centers because there is usually less direct contact between user and operator.

Two important trends in the design of office systems make in-house programs even more important today. Remote terminals linked to a central processor are becoming more and more popular, and DP packages such as Digital Research, Inc.'s CP/M are now available on many systems.

Many more people at various levels in the organization will be using the systems. Training of these individuals is often hit and miss. Vendors do provide manuals, but many professionals don't take the time to use them. Frequently, little communication exists between users of these products, and many ad hoc systems result.

An in-house training program could ensure that all users are trained in a consistent and efficent manner. It could also be the vehicle for informing users of existing software and data bases and for communicating company policy regarding the creation of new software and data bases.

A proliferation of these multifunctional systems throughout many organizations is expected in the near future. Users should consider developing in-house standards for the use of these systems as well as an in-house training program to ensure that they realize the benefits these systems promise.

It is not always reasonable to expect vendors to carry the full burden of operator and user training. Decreasing costs and increasing capabilities will cause multifunctional office systems to find their way into every level of the organization. As a result, user needs will be greater and more varied. Vendors will not be able to meet the myriad training demands that will be placed on them if they are to maintain competitive pricing.

The answer is unavoidable: Users will ultimately shoulder the responsibility of training. In the final analysis, that is the most cost-effective solution. OA

Carrell is managing consultant for Office Sciences International, an OA consulting firm based in Iselin, N.J.

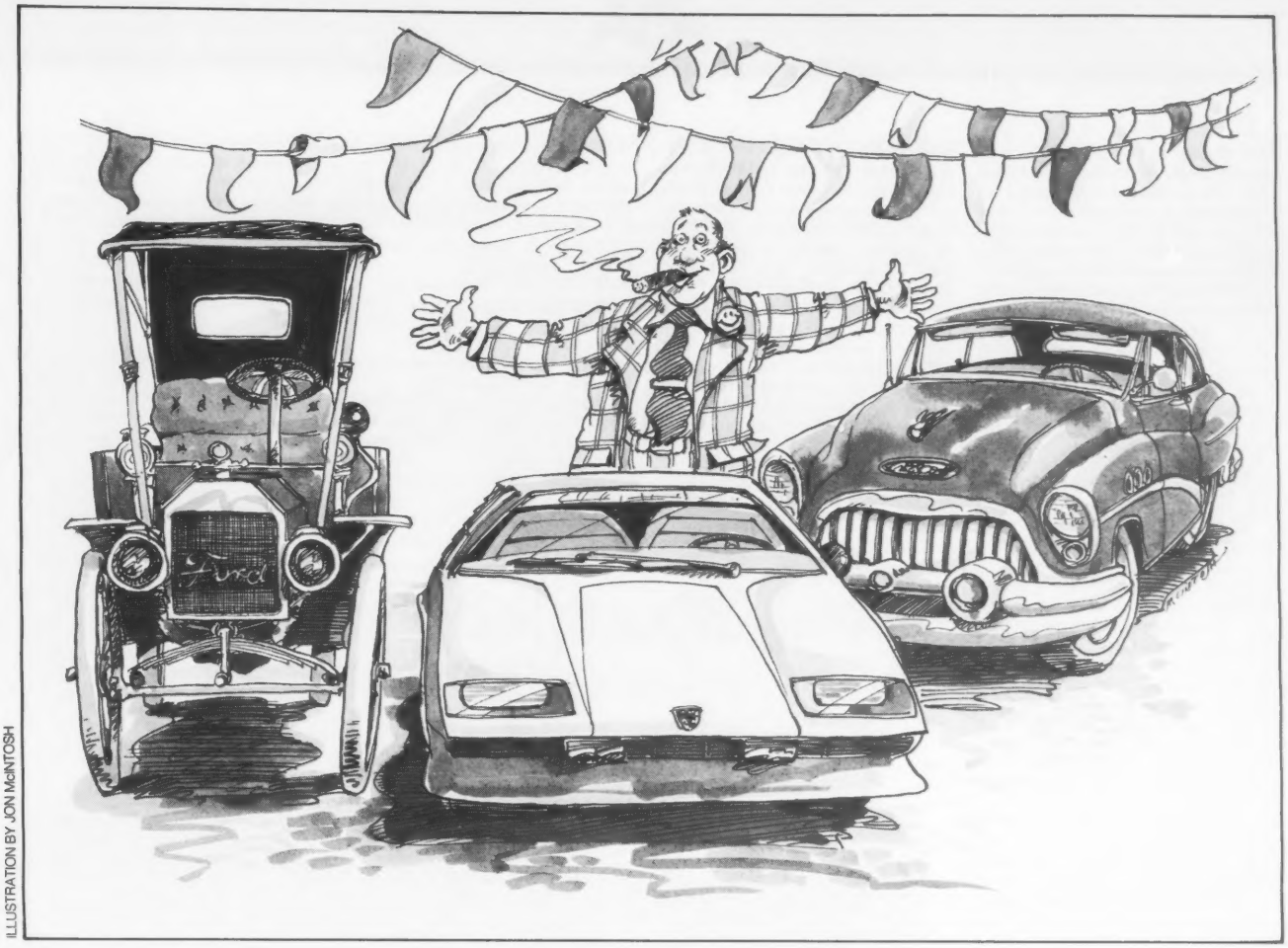

ILLUSTRATION BY JON McINTOSH

Loaded With Options

YOUR WP CHOICES ARE MANY

As smart as office automation consumers are these days, they still don't have enough information about those so-called word processors — the equipment most users choose to usher them into the world of office automation.

Who are the players in the word processing market and what do they offer users? Today, almost every major computer company offers word processing as part of its integrated office package. But before WP became the keystone for the office, the Little Three (or pure-play companies) — Lanier Business Products, Inc., NBI, Inc. and CPT Corp. — were offering complete stand-alone products.

What keeps these companies in business in today's market? The reasons are as varied as the types of users that swear by a Noproblem, an NBI 3000 or a CPT 8100. Each has attained a certain level of popularity and has continually remained in contention for position as *the* WP company still in business when the big computer companies have swept the world market.

It is not the sales pitch, the appearance or any other superficial similarity that keeps these products in the second-tier lead among office processors. It is neither superior word processing nor a particularly unique feature on any one of them. What the three have, and what Wang Laboratories, Inc. and IBM products do not always have, is rich and extended functionality. These products are, in fact, much more than word processors and fill a role beyond text input, editing and output.

The advanced functions of these three major products — the Lanier Noproblem, what is now the CPT 8500 series and the NBI 3000 — have paralleled each other in timing and

BY LORNA HAMBLIN MILLER

development. Without placing marketing emphasis on the fact, the vendors sell toward applications that go far beyond the traditional clerical-upgrade electronic text editing. Ironically, Lanier and CPT have sold the concept of "typewriter replacements," but their products are much more. These extra benefits may not be the reason for the initial purchase, but they are factors in the firms' expanding user bases and a necessary part of users' tightly secreted corporate plans.

What are some of these extra functions that put these pure-play vendors ahead in the eyes of many users? Perhaps it would help to group functional richness into five basic categories:

1. Functions that involve calculations or math packages.
2. Functions that are records processing: sort, select, extract and report.
3. Functions that involve index and file manipulation, locating functions (search), look-up dictionaries, glossaries and other references.
4. A programmable memory that will work interactively with any and all of the above, plus word processing.
5. The screen/spatial manipulation one needs for scientific typing, graphics plotting, forms fill-in and higher mathematics.

The fourth category, keystroke memory (Snap for Lanier, Short Cut for CPT), is not a new concept. Wang's glossary is probably the best-known adaptation of this function. Wang's, however, was not designed for a stand-alone and is not generally considered a part of the normal operator capability. Whatever the case, keystroke memory is the binder for these and any functions.

The key word in keystroke memory is interactive. The system must be able to effectively access any and all on-line files and move in and out of its process in background mode, allowing the keyboard to be a typing machine if necessary. CPT had this capability first. It was foreground, but fast and effective, so degradation of clerical duty was not a problem. However, CPT next advanced to an 8100, 128K-byte random-access memory (RAM) and the PROG (program) key was enhanced by SHORT CUT, which can select out the extraneous while combining the material necessary for a report. Adding a hard-disk ability to all this provides one with a very fast office processor. Adding Digital Research, Inc.'s CP/M and Basic programming, as CPT did, is another advantage for some users.

All of CPT's advanced functions are handled within a programming concept using a control page memorized for anything from printout to disk sort. These plan pages follow the same format; they take up minimal disk space despite the page-buffered operation of the system. CPT can have a control page or a record page (page sort comes bundled on all 8500s) 500 lines long. Math, records processing, reference dictionary and letter/merge can easily combine into one command page operation, activated by a couple of keystrokes.

CPT is not unique in this aspect. Its use of the programmable activity has more mileage and CPT offers some superior design features. But the major factor in CPT's favor is the bundled, interactive capability. The system is also operator-friendly (for CPT-trained operators) because the method to produce operational programs is the same as the method to paginate one printout or do a simple sort.

Both CPT and Lanier concentrate on the buyer who buys again. In addition to a strong marketing approach, these companies have different development facilities devoted to the real-life function of the machine.

While Lanier's pneumonic key command strings turn off critics, Lanier has traditionally offered more guts on a Zilog, Inc. Z80 with 32K-byte RAM than most computer experts could believe.

The limitations on the old Noproblem were that you loaded one program at a time and non-WP functions could not be typed out until memorized and reloaded with word processing. The Super Noproblem came along to rectify that. With a 96K-byte RAM, it performs Snap on any variety of files, records and math processing functions in the background, placing the resulting reports or documents on the alternate disk drive. The minifloppies hold 150 pages so that this stand-alone can easily process some extensive office routines, such as yearly accumulative reports, in a few minutes.

It should be noted here that the keystroke memory on a machine eliminates long commands; in doing so, it can allow relatively inexperienced operators to operate foolproof, complicated routines. Lanier's is also done with planning pages that may be modified at any time. Lanier's EZ1 product, Lanier-designed and based on en-

tirely different architecture, is still an 8-bit machine and has a long way to go in software development and user interface. Advanced packages are a Stage II of any product, so a competitive lag is built in.

NBI's design also originated nine years ago and is still a standard for elegance. It is geared toward word processing at the highest level because that company's concept was to handle lengthy, complex document operations. As a result, NBI did not add the five previously listed capabilities in exactly the same way. In fact, its file management (as a disk read system) was, in the beginning, a strong consideration for users, as was the expansion of its architecture into distributed logic (Oaysis 8 and 64) configurations. Writers, researchers, scientists, financiers and lawyers find the product almost ideal because of the lengths it will go to in a stand-alone version to produce almost any kind of document, revise it countless times, update indexes and outlines and locate material very nicely.

Within the confines of one 8-bit box, operators found themselves in charge of an office system — alas, on the threshold of OA.

The system was the first stand-alone with the dual-head printer capability, necessary for automatically typing scientific formulas. CPT stand-alones now have that capability, but Lanier users must use the shared-logic system to get it. The potential for other mixtures of language on this facility are obvious. CPT, of course, is the world leader in Arabic screen word processors. Graphics control of the screen so that locked-in screen designs interface smoothly with text editing is one of the hot buttons listed under the professional workstation category.

Now that NBI has math, it has added keystroke memory as an option and also offers records processing from which vertical applications can be set up for an infinite variety of settings. Even though NBI has the low-end Docuwriter, it prefers to sell into an environment that does need a full array of capabilities in some settings.

Why are they ahead and others are not? These three firms did the same market research to determine users' perceived needs, they expended a reasonable portion of their budgets in research and development and they came to the market in three very different attitudes. What has set them apart is that some of their customers used the capabilities which, in turn, inspired the use of greater capabilities.

Within the confines of one 8-bit box, operators found themselves in charge of an office system — alas, on the threshold of OA. Software designers on current 16-bit operating systems can learn from the sophisticated transparency of routines on each of these three systems. In many cases, managers experienced an upgrade in productivity beyond what had been anticipated.

The difference between these three companies and IBM is that they had a multifunctional system that worked. The difference between them and Wang is that they had software that went far beyond Wang's and they had people to help the operator become proficient in the operation of that software. They probably haven't made a dent in either IBM's or Wang's projections or real sales figures, but they have captured the concept of widely functional software, well supported by the vendor and versatile in both the present and future tense.

What are other manufacturers doing? It would be futile to investigate all the other companies and their problems either producing comparable quality or selling word processing. The Xerox Corp. 860 is an example of the completeness of a stand-alone and the lack of saturation that it should merit.

Many other firms have come up with comparable lists of software functionality, but have stopped short either in their marketing ability or their software development. Producing articulate WP software does require specialists who understand the office functions, but it is not a difficult task. What is difficult is the stage where marketing departments be-

gin to disagree about details that should be left to more operational types; image, overly dispersed limited research dollars and internal politics then take precedent over progress.

The next group of vendors to look at are the entrepreneurial companies that either provide OEM products (like Convergent Technologies, Inc.) or produce their own brands (like Syntrex, Inc.) or do a little of both (like Fortune Systems).

Can these new competitors take over a corner of the market? Each of these OEM companies has a philosophy that it is small enough to carry out. Part of that philosophy is to produce quality, multifunctional processors that can readily be programmed as word processors and interactively work as accounting, graphics, business projection or other computers.

This is a large order for any single piece of hardware. For programming, it is a large order for Bell Laboratories' Unix or any other multiuser operating system that does not program with the facile exactitude of a Z80. More choices in terms of multifile access exact more decisions to be made about future operations. There is a paradox about limitlessness imposing the greatest limitations.

Perhaps what users should be most concerned with is the software functionality we have talked about — the direct applications that evolve over the first year of ownership.

Two Convergent systems hit the market: one from Savin Corp. and the other from NCR Corp. Savin's was removed by its parent company, Canadian Development Corp. NCR has begun delivering its neatly packaged family of Worksavers. It will take a while for these products or for the Fortune Systems product to develop their full array of capabilities, although the basic and some advanced word processing is pretty complete on both.

Syntrex has employed some excellent concepts on its Unix-operated software and has brought to the market hardware configurations that were innovations — interfacing electronic typewriters with screen and disk storage systems. In advanced versions of its software, Syntrex seems to be stumbling or suffering from turnover in the R&D areas.

By mid-year 1983, some new products might be developed under names other than those of the companies announcing. We cannot ignore the Digital Equipment Corp. 350 product, which has all the trappings of a bang-up multipurpose processor.

Assuming there will always be a market for a full-function standalone processor, the keys to success for various companies are on the following ring:

- Thoughtful, consistent, complete software with more than adequate documentation and easy training potential (wonderful training programs will not appear in a day).
- Easy-to-learn and/or easy-to-use hardware that is as ergonomically comfortable to use as the CPT 8500 series.
- Availability of support for planning and for applications during the early months of an installation, similar to that offered by the Little Three, either as a part of the sale or as an added charge or contract.
- Capability of modular growth in the form of an extra keyboard or in memory increases and external add-on files.
- Available communications link with the rest of the world and with each other.

The current models do the work and they do it well. For some time to come, new models will not be as hardy or as facile. Each — NBI, Lanier and CPT — has a scheme it hopes will keep it around for a long while. Perhaps what their users should be most concerned with is the software functionality we have talked about — the direct applications and the applications that evolve over the first year of ownership.

Any one of them, in its own approach to information processing, can satisfy most organizations' needs, both now and for the next few years. ‡ OA

Miller is an office automation consultant in Trenton, N.J.

F.Y.I.

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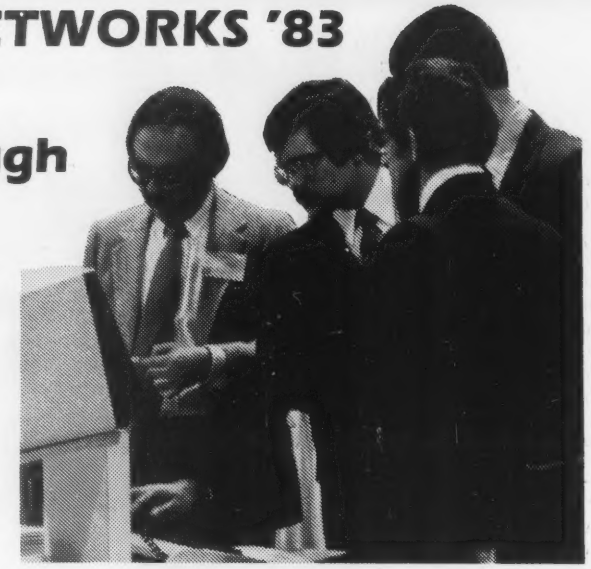

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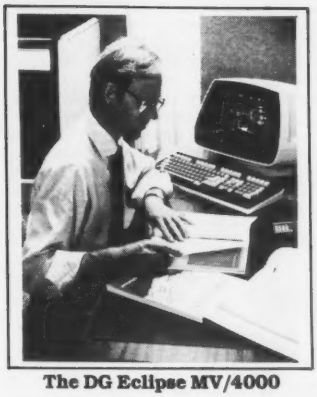


The DG Eclipse MV/4000

WESTBORO, Mass. — **Data General Corp.** introduced the MV/4000, a member of the 32-bit Eclipse MV/Family designed for applications from office automation to industrial automation and targeted to the pilot project or department of a large corporation. As part of DG's Comprehensive Electronic Ofice (CEO) system, the Eclipse MV/4000 includes 2M bytes of main memory, 50M bytes of disk storage, a streaming tape drive for disk backup, eight smart alphanumeric workstations and two 35 char./sec letter-quality printers.

Software includes DG's 32-bit virtual operating system, CEO word processing, CEO Information Management, CEO Decision Support and X.25. Users have a choice of two 32-bit operating systems: the AOS/Virtual Storage or AOS/Real Time 32-bit system. It is compatible with AOS/VS and AOS/RT32 programs for the Eclipse MV/6000 and MV/8000 systems and 16-bit programs written under AOS can be run under AOS/VS, DG said.

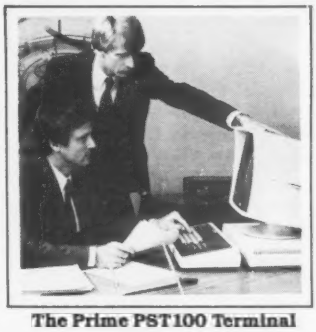
The system costs $7,950 for an eight workstation system. Several peripheral products were also introduced from the firm at 4400 Computer Drive, Westboro, Mass. 01580.

BLUE BELL, Pa. — **Sperry Univac** unveiled its Sperrylink Office System, which functions in an interdepartmental, departmental and stand-alone mode. In the interdepartmental mode, Sperrylink and a distributed communications processor act as an interface to a mainframe, linking distributed office systems with Univac 1100/60, 1100/80 and 1100/90 series mainframes. The departmental mode functions as a series of shared minicomputer-based distributed office systems and, finally, the system functions as a single word processing or personal computer station.

The Sperry Univac Sperrylink

A typical 30-person department would pay $277,000 based on a microprocessor-based desk station with 128K bytes of memory, a 25-line adjustable CRT display and a movable keyboard, the vendor said. Sperry can be reached through P.O. Box 500, Blue Bell, Pa. 19424.

NATICK, Mass. — A compact low-end system featuring up to 4M bytes of main memory and up to 316M bytes of on-line disk storage was introduced by **Prime Computer, Inc.** as it extended its 32-bit minicomputer line further into the OA market. Aimed at the distributed office, the Model 2250 supermini supports up to 32 terminals in an interactive mode and reportedly handles up to 128 simultaneous operations. The system's base price with 512K bytes of memory, a 68M-byte Winchester disk and the PST100 terminal is $39,900.



The Prime PST100 Terminal

Prime also announced an extended service plan and compatibility of Prime systems with IBM's Systems Network Architecture. Prime is at Prime Park, Natick, Mass. 01760.

SUNNYVALE, Calif. — **Hewlett-Packard Co.** has expanded its personal computer family with two additional models that are each equipped with a 3½-in. floppy diskette unit and are said to occupy about as much space as an open three-ring binder. One of the two systems, the Series 100 Model 120 is intended primarily for office use in both large and small companies. The other system is targeted at engineering and scientific applications.

With a detachable keyboard, the Model 120 incorporates a processor, 9-in. display screen and the HP Series 9100 microfloppy diskette unit. In computing power, the Model 120 rivals HP's existing Series 100 Model 125 personal computer, but occupies less space, the vendor said. The Model 120 costs $2,775 from dealers or HP at 978 E. Arques Ave., Sunnyvale, Calif. 94086.

ATLANTA — **Lanier Business Products, Inc.** has announced the Shared System II computer system, reportedly capable of combining more than 700K bytes of internal memory with up to 256K bytes of instructional memory, up to 192K bytes of data memory and up to 192K bytes of video memory. A basic system, including dual floppy disk drive, two workstations, a printer, 192K bytes of instructional memory, 128K bytes of data memory and software options, costs $40,000, Lanier said.

Also available is the Lark Module Drive fixed/removable storage device for all its Shared Systems, which features 8M bytes fixed and 8M bytes removable storage. A single drive costs $12,000.

Textlink, a high-speed data cable connection reportedly capable of linking up to five Shared Systems and 40 workstations without the use of phone lines or modem, costs $1,750 per Shared System from the firm at 1700 Chantilly Drive N.E., Atlanta, Ga. 30324.

DAYTON, Ohio — **NCR Corp.** has added an entry-level model called Firststep featuring document compatibility with other Worksaver systems. The Worksaver Firststep model consists of a 12-in. CRT display, a microprocessor-based controller with 64K bytes of memory and dual 5¼-in. diskette drives and a detached keyboard; it reportedly costs $3,795. Firststep models operate under software called Firstword, which is available for a one-time fee of $500.

NCR also announced Multiplan, the Microsoft Corp. financial modeling program that is available on the system for a one-time license fee of $250. A CP/M 2.2 operating system was also announced by NCR, which is headquartered in Dayton, Ohio 45479.

The NCR Worksaver Firststep

The Compaq Portable Computer

HOUSTON — **Compaq Computer Corp.** is offering a portable processor said to be compatible with IBM's Personal Computer. The processor is reportedly capable of running all the major software packages used with the IBM micro, including Visicorp's Visicalc and Information Unlimited Software, Inc's Easywriter word processing package. Scheduled for shipment in 1983, in as yet undisclosed retail stores, the Compaq includes a 16-bit Intel Corp. 8088 microprocessor with a 9-in. diagonal screen and 128K bytes of random-access memory. The Compaq costs $2,995 from the vendor at 12337 Jones Road, Houston, Texas 77070.

The Dictaphone System 6000

RYE, N.Y. — **Dictaphone Corp.** has unveiled the System 6000, a word processor with data retrieval features, which reportedly integrates word processing and information management. The System 6000 comes with specialized software, called Straight Talk, that is said to simplify data retrieval, according to the firm.

To extend the systems' capabilities beyond those available with stand-alone units or multistation configurations, the company also is offering Omninet, a local-area network designed specifically for the System 6000, enabling it to be linked to other terminals and a variety of personal computers using the Digital Research, Inc. CP/M operating system.

A basic system including a half-page CRT screen, separate modular keyboard, double-sided 5¼-in. disk drive and a daisywheel printer costs $5,950 from the firm at 120 Old Post Road, Rye, N.Y. 10580.

TECHNOLOGY

WILTON, Conn. — The Nomad2 Information Center being offered by **National CSS, Inc.** consists of three components: an enhanced version of the Nomad2 data base management system, a training program that includes both classroom and self-study sessions and documentation and training materials.

In addition to being available on the NCSS time-sharing service, the enhanced Nomad2 is available on a stand-alone basis with the IBM 4341 Model Group 2 or compatible processors running under VM/CMS in IBM VM/370 internal time-sharing environments. The Nomad2 is available for $120,000 from NCSS at 187 Danbury Road, Wilton, Conn. 06897.

WALTHAM, Mass. — A configuration of the **Nixdorf Computer Corp.** 8845 Integrated Office System (Nios) has been announced at reportedly a lower cost than previous models. The Nios system uses Nixdorf's Editor, a high-level business programming language, to provide DP capabilities. Editor commands parallel Cobol commands and, like Cobol, generated application programs permit tailoring the system to specific requirements.

Nios consists of the 8845/4 processor, a 33M-byte disk, a tape drive, diskette, workstation and 45 char./sec printer at a cost of $30,227 or $720/mo. lease from the firm at 300 Third Ave., Waltham, Mass. 02154.

MOUNTAIN VIEW, Calif. — **3COM Corp.** unveiled a series of IBM Personal Computer plug-compatible and software-compatible products to connect the IBM devices together into a Xerox

TECHNOLOGY

Corp. Ethernet local-area networking environment. When the IBM micro is equipped with the Etherlink — a plug-in controller/transceiver board — it becomes a network station. Accompanying software diskettes permit users to share files and printers located at other Personal Computer stations.

Etherlink costs $950, the vendor said. Other Etherseries products were also announced from the firm at 1390 Shorebird Way, Mountain View, Calif. 94043.

MINNEAPOLIS — **Lee Data Corp.** has introduced the Model 0700 Personal Workstation, which reportedly adds an IBM-compatible personal computing capability to the firm's existing IBM 3278 and Digital Equipment Corp. VT100 emulation offerings. The personal computing capability contains an Intel Corp. 8088 processor, 128K bytes of program memory, a single 5¼-in. floppy diskette drive, a display interface, a printer interface and four expansion slots. An 80-col CRT monitor with the basic personal computer attachment costs $4,749, the vendor said. The basic Model 0700 Personal Workstation costs $2,733 with leasing available from the firm.

More information is available from Lee Data, 10206 Crosstown Circle, Minneapolis, Minn. 55344.

SAN ANTONIO, Texas — The **Datapoint Corp.** Model 1560 Small Business Computer System is being offered, featuring a Z80A-based microprocessor, a 12-in. screen, 64K bytes of memory expandable to 128K bytes, and support capabilities up to 40M bytes of disk storage, three extra terminals and a printer via RS-232C interfaces. The 1560 offers two operating systems, Datapoint's DOS.H Disk Operating Systems and a version of CP/M.

The basic Model 1561 starts at $3,195 from the firm at 9725 Datapoint Drive, San Antonio, Texas 78284.

BOULDER, Colo. — A software package to generate line graphs, pie charts, bar graphs and word charts has been unveiled by **Precision Visuals, Inc.** Called Grafmaster, the interactive package eliminates keystroking of statements and offers self-teaching procedures. The system also reportedly can adjust to a user's specific vocabulary to interact with the package.

Grafmaster will be available in February 1983 on Digital Equipment Corp. VAX systems, and in April 1983 on IBM systems, for $18,000 from the firm at 6260 Lookout Road, Boulder, Colo. 80301.

ITHACA, N.Y. — A desktop color graphics terminal, Graphos, reportedly capable of displaying and manipulating 16 windows, has been introduced by **Ithaca Intersystems, Inc.** Designed primarily for business use, Graphos features mid-to high-range resolution, individual scroll, pan and zoom for each of the 16 windows, two-dimensional segment transformations, multiple fonts and selection from 32,768 colors, according to the vendor.

Graphos incorporates a Motorola, Inc. MC68000 microprocessor to implement the device independent subsystem. Graphos' Shiftable Cell concept combines alphanumeric and bit-mapping architecture with cells dynamically assigned to the 16 windows on the screen. The Graphos system costs $7,995 from the firm at 1650 Hanshaw Road, Ithaca, N.Y. 14850.

RYE, N.Y. — **IBM** has expanded the capabilities for its System/38 computer, including applications software for the office environment. The applications programs are called IBM System/38 Office/38 and are aimed at the professional and administrative office worker.

First shipments for attachment to the System/38 are planned for September 1983. The units will also attach to the System/34, with first shipments planned for April 1983. Prices vary with each capability offered. OA

CALENDAR

Dec. 1-3, Albuquerque — **Network Communication Protocols.** Also Pittsburgh, Pa., Dec. 8-10; Baltimore, Dec. 15-17 and Minneapolis, Dec. 20-22. Contact: Center for Advanced Professional Education, Inc., 11928 N. Earlham, Orange, Calif. 92669.

Dec. 6-7, Boulder, Colo. — **Device Independent Graphics.** Contact: Precision Visuals, 250 Arapahoe, Boulder, Colo. 80802.

Dec. 6-8, New York — **American Bells's Advanced Information Systems.** Contact: Technology Transfer Institute, 741 10th St., Santa Monica, Calif. 90402.

Dec. 6-8, Washington, D.C. — **Second Annual Conference on Computer Graphics.** Contact: U.S. Professional Development Institute, 12611 Davan Drive, Silver Spring, Md. 20904.

Dec. 6-8, Los Angeles — **Automated Office VI.** Contact: National Institute for Management Research, P.O. Box 3727, Santa Monica, Calif. 90403.

Dec. 7-9, New Orleans — **Third Office Automation Conference. Integrating Office Systems with Converging Technologies.** Contact: Data Processing Management Association, 12611 Davan Drive, Silver Spring, Md. 20904.

Dec. 8-10, Washington, D.C. — **Office Automation: Concepts, Systems and Applications.** Also Dec. 15-17, Los Angeles, Calif. Contact: Seminar Department, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Dec. 13-15, New York — **Office Automation: Strategic Planning Techniques.** Contact: Seminar Department, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Dec. 13-15, Washington, D.C. — **Office Automation for Management Productivity.** Contact: Suite 334, The Information Exchange, 4500 S. Four Mile Run Drive, Arlington, Va. 22204.

Dec. 14-16, Andover, Mass. — **Business Applications for Computer Graphics.** Contact: The Institute for Graphic Communication, 375 Commonwealth Ave., Boston, Mass. 02115.

Dec. 15-17, Chicago — **Microcomputer Systems: A Guide to Selection and Application.** Contact Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Jan. 10-13, Boca West, Fla. — **Office Automation and Networks: Keys to a Successful Corporate Information Strategy.** Contact: National Council for Education on Information, 286 Boston Post Road, Wayland, Mass. 01778.

Jan 12-14, Washington, D.C. — **Managing Application Development in the Small Computer Era.** Contact: George Mason University, U.S. Professional Development Institute, 12611 Davan Drive, Silver Spring, Md. 20904.

Jan 17-18, Providence, R.I. — **Planning for Office Automation.** Contact: The Center for Management Development, Bryant College, Smithfield, R.I. 02917.

Jan. 19-21, Pasadena, Calif. — **Infowest '83.** Contact: Information Processing Group, 350 S. Lake Ave., Suite 113-150, Pasadena, Calif. 91101.

Jan. 31-Feb. 3, New Orleans, La. — **Communications Network.** Contact: Communications Network '83, Box 880, Framingham, Mass. 01701.

Feb. 14-17, Vail, Colo. — **Office Automation and Networks: Keys to a Successful Corporate Information Strategy.** Contact: National Council for Education on Information Strategies, 286 Boston Post Road, Wayland, Mass. 01778.

Feb. 21-23, Philadelphia, Pa. — **Office Automation Conference.** Contact: American Federation of Information Processing Societies, Inc., 1815 N. Lynn St., Arlington, Va. 22209.

Feb. 22-24, New York — **Office of the Future — Today!** Contact: National Institute for Management Research, P.O. Box 3727, Santa Monica, Calif. 90403.

Feb. 23, Wellesley, Mass. — **Office Automation: Conceptual, Organizational and Human Concepts.** Contact: Q.E.D. Information Sciences, Inc., P.O. Box 181, 180 Linden St., Wellesley, Mass. 02181.

Feb. 24-25, Washington, D.C. — **Paperless Office.** Contact: Micronet, Inc., Watergate Mall, 2551 Virginia Ave. N.W., Washington, D.C. 20037.

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